THE IRON TRADE REVIEW

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PIG IRON DULL

AND LOWER PRICES NAMED IN SOME CENTERS.

Good Showing in Ore Shipments.—Slightly Decreased Daily Blast Furnace Output.

The continued dullness of the pig iron market has caused a softening of prices in some centers, especially in Chicago, where there has been a decline of about $1.00 per ton. Quotations in Chicago have been somewhat higher than in most places, and nearly all reports are that quotations are fairly well maintained in spite of the absence of buying. Malleable is not so strong as it was, some concessions having recently been made for delivery next year.

The End of the Strike

Laborers on the ore docks at the head of the lakes returned to work last Thursday, and nearly all the men at the mines followed a day or two later. Owing to gains at other ports not affected by the strike, a surprisingly favorable showing of shipments for July is made, the total being 4,849,117 tons, a loss of 913,655 tons compared with July, 1906, but the shipments for the season to Aug. 1 are ahead of those of the same period last year 530,373 tons, and the outlook is for a very heavy movement during the remainder of the season. Last month the ports at the head of the lakes shipped 54 per cent of the total, against 69 per cent in July, 1906.

Blast Furnace Output

Our monthly statistics of blast furnace production show an output of 2,257,993 tons for July, compared with 2,237,420 tons for June, an increase of 20,573 tons. As July had 31 days, the daily average is not so large as for June, but for a midsummer month the production makes an excellent showing.

Finished Material

Finished lines continue in a very satisfactory condition. Although it is true that new business of the leading interest is not so heavy as it was a short time ago, this condition can be accounted for to a large extent by the small number of orders for rails for 1908 delivery, pending the report of the joint committee of railroad men and manufacturers concerning specifications, also to the discontinuance by the Corporation of its contracts for semi-finished steel. The Illinois Steel Co.'s sales this year have been 3,000 tons heavier per week than they were last year, and the sales of the American Steel & Wire Co. have been 1,000 tons more per day than they were last year. The American Bridge Co. this year has taken orders for about 320,000 tons of structural material, which is about one-half the country's consumption. Similar statistics could be given concerning other subsidiary companies, and evidence of the prosperity of independent interests is not lacking.

Structural Material

The demand for structural material is strong, and some independent interests have been important factors during the past week, among the orders taken by them being 10,000 tons of steel for the Edison power plant, New York, and 7,000 tons for the Hay foundry. The American Bridge Co. will furnish the 20,000 tons of steel needed to complete the Pennsylvania terminals, the contract having been taken originally by the firm of Milliken Bros., now bankrupt.

Strong Demand for Plates

While large premiums are not so frequently paid for delivery of plates, the demand continues strong. A contract for steel for another lake vessel has been placed, and it is expected that orders for several others will be booked shortly. A number of inquiries of good size for steel piling are pending in the lake district, and a traction company has placed an order for steel ties. Orders for 11,000 tons of standard sections for a steam railroad, and 6,000 tons for a traction line, which had been deferred pending the making of financial arrangements, have been placed with the Lackawanna Steel Co.

COKE PROPERTY SOLD

And Will be Operated.—Machinists Return.—No Agreement with Coal Miners.

(Special Telegram.)

Pittsburg, Aug. 7.—The properties of the Old Colony Coal & Coke Co. in Westmoreland, Somerset county, Pa., have been sold at trustee's sale under order of court, and the successful bidder, subject to confirmation of the sale by the court, was George W. McClure, of George W. McClure, Sons & Co., engine builders of Pittsburg. If the sale is confirmed, the purchaser intends to take possession and operate the plant at once. The property includes 5,000 acres of coal and timber lands, 100 coke ovens, mining equipment and a mining town.

The latest development of the machinists' strike in the Pittsburg district is the return of the machinists to the plant of Mackintosh, Hemphill & Co. The old men went back as individuals and the men who were employed during the strike were distributed among other plants whose union employes are still out. Neither side to the controversy will make a definite statement, but it is understood the old men went back without having obtained any concessions.

No agreement has yet been reached between the United Mine Workers' union in the Pittsburg district and the officials of the Pittsburg Coal Co., involving a threatened strike of 12,000 coal miners in that district.

THE WEEK IN IRON CENTERS

PITTSBURG.

Pig Iron Prices Well Maintained—Finished Lines in Satisfactory Condition.

Office of THE IRON TRADE REVIEW,
521 Park Building, August 6.

The strike on the ore ranges and docks at the head of the lakes is over, and pig iron prices are holding their own in good shape, although very little pig iron is being sold, and, taken altogether, market conditions in the Pittsburg district are in a very satisfactory condition. The volume of new business in finished lines is holding up in good shape; the tonnage is not heavy, it is true, but it is not to be expected that the record-breaking clip of the first six months of the year could continue indefinitely. Specifications against existing contracts are very heavy with but very few exceptions and about the only lines in which mills are catching up on their order books are wire products and tin plate.

A partial explanation of the repeated statements that the books of the leading interest do not show as much business ahead as the natural increase from month to month might warrant is that the standard rail business for the past two months has been practically nothing, pending a decision of the railroads on their 1908 specifications, and also the policy of the corporation to discontinue its contracts for semi-finished steel as fast as they expire, instead of seeking their renewal. The controversy over the rail situation will be adjusted before long, but no change is expected as far as semi-finished steel is concerned, inasmuch as the Carnegie Steel Co. has been a buyer for several months past. The demands of its own and subsidiary company finishing mills have been so heavy that difficulty has been experienced in meeting outside contract obligations.

The report that the Steel Corporation had purchased the plant of the Midland Steel Co., at Midland, Pa., is absolutely denied, and the $15,000,000 mentioned in connection with the report is about three times the amount that would be involved were there any truth in the story. The corporation is not that badly in need of furnace capacity. New No. 7 stack at Carrie group, Rankin, Pa., was blown in Aug. 2, No. 6 of the same plant having been blown in June 6. Stacks Nos. 5 and 6 are under construction at the Duquesne plant and Nos. 5 and 6 are building at the Ohio plant at Youngstown. With the completion of No. 7 at Carrie group, the Corporation has 55 blast furnaces complete, of which 54 are in operation, the idle stack being at Edgar Thomson plant. With the completion of work now under way at Duquesne and Ohio plants, the Corporation will have 59 blast furnaces.

Pig Iron.—In addition to the sale of 10,000 tons of Bessemer pig iron by the Bessemer association to the Corporation, W. P. Snyder & Co., of Pittsburg, sold 5,000 tons, making a total of 15,000 tons at $22, valley furnace, for August delivery purchased by the leading interest. The 10,000 tons sold by the association was secured from the Youngstown Sheet & Tube Co., of Youngstown, O., which, during the past few months has sold considerable skelp to the National Tube Co. The Youngstown concern last April bought 170,000 tons of Bessemer iron at $21, furnace. The price paid by the Corporation is at least 50 cents per ton under the market at this time and Bessemer iron is now quoted $22.50 to $22.75 valley, for any delivery during the remainder of the year.

Northern No. 2 foundry iron is quoted $22.50 to $23 valley for spot shipment or delivery during the remainder of the year and gray forge or mill iron at $21, furnace. We note the sale of 4,000 tons of malleable Bessemer for first quarter of next year at $22 furnace, to the consumer, having been sold through a middleman. The monthly average of sales on Bessemer pig iron through July was $22.41, furnace, as compared with $23.25 in June, a decline of 84 cents for the month. There is some inquiry for small lots of foundry iron running mostly in carload lots. We note the sale of 100 tons of off Bessemer at $22.75, valley, to a large consumer of foundry iron. There is practically no inquiry in the market for steel-making iron for next year deliveries. For delivery during the remainder of the year we quote as follows:

Bessemer, Valley	$22.50 to 22.75
Bessemer, Pittsburg	23.40 to 23.65
No. 1 Foundry, Pittsburg	23.75 to 24.00
No. 2 Foundry, Pittsburg	23.40 to 23.65
Gray Forge, Pittsburg	22.40 to 22.90
Basic, Valley	22.00 to 22.25
Basic, Pittsburg	22.90 to 23.15

Ferro-Manganese.—An improvement is noted in the inquiry for ferro-manganese and ferro-silicon and a wide range of prices is being quoted. For prompt delivery, foreign 80 per cent ferro-manganese, we quote $63 to $63.50, Pittsburg, and for forward shipment $61 to $62, delivered in carload lots. There is an inquiry in the market for 100 tons and several others for carloads.

Imported 50 per cent ferro-silicon is quoted $108 to $110 Pittsburg, domestic 12 per cent, $36; 11 per cent, $35; 10 per cent, $34. The lower grades of imported ferro-silicon are quoted $1 lower. These quotations are applicable to Pittsburg territory.

Plates.—The leading interest reports July the heaviest of the past three months as far as current orders and specifications are concerned. On these two items July was 25 per cent ahead of June. Mills are taking on enough new business to keep obligations about even, this new business being about equal to shipments. Tonnage on the books was in no way decreased and delivery promises on new contracts are from five to eight months. Specifications by the Bridge company were a little heavier than usual during the week under review, and the requirements from independent fabricating companies were normal. Prices are unchanged and we quote as follows:

Tank plate, ¼-inch thick, 6¼ to 100 inches, 1.80c to 1.90c f. o. b. mill Pittsburg for prompt shipment, and 1.70c base Pittsburg on future deliveries. Extras are as follows per 100 pounds: Boiler and flange steel plates, 0.10c. A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than four inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in width over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1.00c. Gages under ¼-inch to and including 3-16-inch plate on thin edges, 0.10c; under 3-16 to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—While the new demand is not heavy, market conditions are exceedingly strong and specifications heavy. Mills are gradually catching up on their deliveries with the exception of galvanized and blue annealed. Prices are unchanged and we quote:

Black steel sheets one pass, cold rolled, Nos. 11-12, 2.20c; Nos. 13-14, 2.25c; Nos. 15-16, 2.30c; Nos. 17-21, 2.35c; Nos. 22-24, 2.40c; Nos. 25-26, 2.45c; No. 27, 2.50c; No. 28, 2.60c; No. 29, 2.75c; No. 30, 2.85c; galvanized Nos 10-11, 2.65c; Nos. 12-14, 2.75c; Nos. 15-16, 2.85c; Nos. 17-21, 3.00c; Nos. 22-24, 3.15c; Nos. 25-26, 3.35c; No. 27, 3.55c No. 28, 3.75c; No. 29,

4.00c; No. 30, 4.25c; blue annealed, No. 10 and heavier, 1.85c; Nos. 11-12, 1.90c: Nos. 13-14, 1.95c; Nos. 15-16, 2.05c. Corrugated roofing, $1.90 per square for No. 28 painted, 2½-inch corrugation, and galvanized, $3.25 per square for No. 28.

Tin Plate.—The inquiry has improved and considerable new business has been taken on during the past week. Several small tonnages have been taken on for the first quarter of next year. We quote:

Coke tin plate 100-pound basis, 14 x 20, $3.90 f. o. b. mill, Pittsburg district. Terms, 30 days, less 2 per cent for cash in 10 days.

Rails and Track Material. — The past week is the second during which no new business has been taken on, as far as standard sections are concerned, by the Carnegie Steel Co., and this single item is largely responsible for the decrease in tonnage figures showing new business for the Corporation. The situation on light rails continues good, and the demand has been equal to that of the past few months. Deliveries on new contracts are about three months. The Pittsburg and Lake Erie railroad is the latest to take up steel ties, and is now laying one and a half miles in its main line through McKees Rocks near Pittsburg. The spike situation is easier, especially on standards, although the heavier demand for hand spikes has deferred delivery promises. Two members of the joint commission to pass upon 1908 rail specifications are in Europe, and nothing is expected from railroads so far as placing their next year's requirements are concerned, until after these members return and act upon information placed before them. On the old rail specifications for 1907 and 1908 deliveries, we quote as follows:

Fifty-pound and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; 8-pound, $40; 12-pound, $36 to $37; 16-pound, $35 to $36; 20-pound, $34 to $35; 25 to 45-pound, $33 to $34; angle splice bars for standard sections, $1.65; standard spikes for forward deliveries, $2.30 to $2.35 Pittsburg; hand spikes, $2.50 Pittsburg.

Hoops, Bands and Cotton Ties.—This market has been quiet except for the usual heavy specifications. New contracts for the year are expected immediately after the meeting of the Cooperage Association in Cincinnati this week. We quote as follows:

Hoops in carload lots, 2c; in less than carload lots, 2.10c; bands, 1.60c, base half extras as per standard steel. Cotton ties, 96½c per bundle.

Steel.—The sheet bar and small billet mills of the Lackawanna Steel Co. of Buffalo, will be in operation within a short time and the company is offering a small quantity of these semi-finished lines for deliveries beginning in September, although it has already sold up pretty well for the balance of the year. The Carnegie Steel Co. has bought some steel during the past week, but the tonnage has not been large. We quote Bessemer billets $30 to $30.50 Pittsburg from Pittsburg mills and $31 to $31.50 Pittsburg on open-hearth. Sheet bars are nominally quoted $31, mill, Pittsburg or Youngstown.

Merchant Bars.—There is still some steel bar contract business that has not been closed for the year, but this is largely fag ends and for requirements of consumers who feel there is nothing to be gained by closing now, inasmuch as they can get the same deliveries later on. The big producers are now shipping out the last of their low price contract material taken on last year. Aside from a 1,200-ton inquiry for iron bars by a steel car company, bar iron has been quiet, but prices are firm. The conciliation board in session at Cambridge Springs completed taking evidence last Saturday and a decision is expected Thursday. We quote as follows:

Common iron bars, 1.75c to 1.80c Pittsburg in carload lots and over, 1.80c to 1.85c in less than carloads; 1.60c base Pittsburg, plus freight to point of shipment on western deliveries; Bessemer steel bars, 1.60c, net for future deliveries; 1.85c to 1.90c out of stock; plow and cultivator, 1.60c, net; channels, angles, zees, tees, under three inches, 1.70c, all f. o. b. Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds, 0.10c advance; less than 1,000 pounds of a size, 0.30 advance. Cold rolled and ground shafting, 50 per cent off in carloads and 45 per cent in less than carloads, delivered in base territory; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flats, 1.60c to 1.65c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.10c to 2.15c. The price of planished and machine straightened tire is 1.80c, base, half tire extras. Iron finished tire up to 1½ inch and over to be sold on regular bar basis of 1.60c base, half extras, steel card.

Structural Material.—Mills are in good shape as far as bookings are concerned, but the leading interest is in position to cover the full range of rollings within seven to eight weeks. Fabricating companies have a fair run of business ahead of them and are specifying freely against mill contracts. Among some of the new contracts taken in this district during the week are: New machine shop, Columbus, O., 700 tons; new machine shop, Youngstown, O., 250 tons; mill building, Pittsfield, Mass., 700 tons; Chicago, Milwaukee & St. Paul railroad, Cow Creek viaduct, 1,700 tons. Mill prices are unchanged and we quote:

Beams and channels, 15-inch, and under, 1.70c; over 15 inches, 1.80c; zees, 1.70c; tees, 1.70c; angles from three to six inches inclusive, 1.70c; over six inches, 1.80c; universal and sheared plates, 6¼ inches and wider, 1.80c base.

Wire and Wire Nails.—The sales of wire fencing have been very heavy, but at this time the new business in nails and plain wire is comparatively light, although specifications against existing contracts are very heavy. Mills are beginning to catch up on their order books, although many of them are five to six weeks behind, and promises on new contracts are from eight to nine weeks. At this time last year, mills were stocking, in anticipation of a full buying movement, but at the present time unless there is a very material change, mills will start their full season with practically no stocks. Manufacturers of steel cut nails have advanced their price 5c. Prices on wire products are unchanged and we quote as follows:

Wire nails, jobbers' carload lots, $2; retailers' carload lots, $2.05; less than carloads, $2.10; painted barb wire, $2.15, for jobbers in carloads; retailers in carloads, $2.20; and less than carload, $2.30, with 30c for galvanizing; plain wire, $1.85 for jobbers, and $1.90 by carload.

Coke.—The coke market is decidedly stronger this week than last and a large consumer has bought a fair tonnage for shipment over the next 60 days at $2.75 ovens for furnace coke. Some of the buyers are now in the market for spot coke on account of not getting deliveries on contracts. The tightening up of the market is due to the fact that there is a temporary shortage in production, brought about by a scarcity of labor and the hot weather. This situation during the present week has slightly improved and production should increase from now on. Furnace coke for spot shipment is quoted $2.60 to $2.70 and for shipment during the remainder of the year $2.75. A large consumer of foundry coke in the east has an inquiry out for 12 cars a week for the year. Spot foundry coke is quoted $3.15 to $3.30 and for the remainder of the year, the same.

Merchant Pipe.—The National Tube Co. has four of its new furnaces and all of its rolling mills at McKeesport in operaiton and the work of installing

new furnaces is being rushed as rapidly as possible, the new equipment gradually replacing the old. The greatest difficulty experienced by consumers of pipe is in placing their orders at this time. A half dozen fair sized inquiries are in the market, but on account of the filled up condition of the mills for a long time ahead, manufacturers of merchant pipe are taking on only such business as is necessary to meet the requirements of their old customers. This condition is reported by the National Tube Co., La Belle Iron Works, Youngstown Sheet & Tube Co., Spang, Chalfant & Co. as well as others. We quote the following official discounts to consumers in large lots subject to one point and five to jobbers:

	—Steel— Black.	Galv.
⅛ and ¼ inch	65	49
⅜ inch	67	53
½ inch	69	57
¾ to 6 inches	73	63
7 to 12 inches	70	55
EXTRA STRONG PLAIN ENDS.		
⅛ to ⅜ inch	58	46
½ to 4 inches	65	53
4½ to 8 inches	61	49
DOUBLE EXTRA STRONG PLAIN ENDS.		
½ to 8 inches	54	43

Iron Pipe.—Conditions have in no way changed and manufacturers of iron pipe are overwhelmed with business and pressing demands for deliveries. Only business from old customers is being accepted. We continue to quote:

RANDOM LENGTHS WITH THREADS AND COUPLINGS—CARLOAD LOTS.	Black.	Galv.
⅛, ¼ and ⅜ inch	59	43
½ inch	62	51
¾ and 6 inch	67	57
7 and 8 inch	62	46
PLUGGED AND REAMED.		
1 to 4 inch	65	55
EXTRA STRONG PLAIN ENDS.		
⅛, ¼ and ⅜ inch	52	40
½ to 4 inch, inc	59	47
4½ to 8 inch	55	42
DOUBLE EXTRA HEAVY PLAIN ENDS.		
½ to 3 inch, inc	48	37

Boiler Tubes.—Specifications against contracts are very heavy. There is comparatively little new business, inasmuch as the large consumers have already contracted for their requirements for the remainder of the year. Prices are unchanged and we quote as follows:

	Iron.	Steel.
1 to 1½ inch	42	47
1¾ to 2¼ inch	42	59
2½ inch	47	61
2¾ to 5 inch	52	65
6 to 13 inch	42	59

2¼ inches and smaller, over 18 feet, 10 per cent net extra.
2¾ inches and larger, over 22 feet, 10 per cent net extra.

Old Material.—In spite of the quiet conditions ruling in the scrap iron market, prices have been well maintained and there is no real indication of weakness. There has been no trading and consumers have not been looking for scrap. The Carnegie Steel Co. has not been buying from jobbers, but is reported to have bought direct from the Pennsylvania railroad list which came out on the first of the month. Dealers with stocks are not sacrificing them, and are not moving material unless they get a fairly good price for it. Prices are nominal and we quote as follows, gross tons, delivered in the Pittsburg district:

Heavy melting scrap $18 to $18.50; re-rolling rails, $18.75 to $19; bundled sheet scrap, $15.50 to $16; iron axles, $30.50 to $31; old iron rails, $23 to $24; No. 1 wrought scrap, $18 to $18.25; old car wheels, $24 to $24.50; low phosphorus scrap, $23 to $23.50; machine shop turnings, $15 to $15.50; axle turnings, $15.75 to $16; cast borings, $13 to $13.50; No. 1 cast scrap, $20 to $20.50.

CHICAGO.

Sharp Decline in Pig—Finished Lines Active—Scrap is Weak.

Office of THE IRON TRADE REVIEW, 1362 Monadnock Block, Aug. 7.

The slump in pig iron is of the most interest this week. Prices dropped $1.00 a ton on all deliveries, and there is a feeling that the bottom is still untouched. There is a total absence of buying activity, and fewer sales have been recorded in the week under review than in any equal period for a twelvemonth. The demand and consumption of finished materials, however, is in marked contrast to conditions affecting the crude product. New tonnage is constantly coming forward and specifications are continually in excess of the mill output. The Illinois Steel Co.'s sales this year have been 3,000 tons heavier each week than they were in 1906, despite the restricted tonnage in rails placed since the books for 1908 were opened; while the sales of the American Steel & Wire Co. have been 1,000 tons more per day than they were a year ago. The demand for steel bars and agricultural shapes was never so great as it has been this summer, and combined with the unusual activity of car builders and railroads, which have specified very freely for plates and shapes, should set at rest any doubts as to the opinions these interests have of the size or value of the crops this year. While there is an absence of large building projects, there continues an exceedingly brisk demand for material to enter into small structures, in the aggregate making a round tonnage. Specifications have been received this week for about 20,000 tons of plates and shapes, and contracts have been closed for 17,000 tons of rails, 2,000 tons of cast iron pipe, and 4,000 tons for another lake boat.

Pig Iron.—Within the week past southern pig iron suffered the worst setback it has received in a year. Prices on all deliveries have declined $1.00 a ton. Twenty dollars is the nominal Birmingham quotation now on No. 2 foundry for the third quarter, but on desirable tonnage $19.50 can be done. For the fourth quarter $19 Birmingham is the nominal quotation for No. 2, but a round tonnage could easily shade this price to $18.50. Deliveries in 1908 are as susceptible to pressure as those for this year, and doubtless $18 Birmingham, which is asked for the first quarter, could be shaded. The market is very weak, and there is no demand to speak of. Shipments on a contract of 3,000 tons, bought when the market was several points higher, were declined last week by a local implement interest because the metal was overdue, and the contract was cancelled. The furnace offered to meet the prevailing price, providing the tonnage was accepted, and, on receiving another refusal, agreed to shade the market $1.00 a ton, but the offer was again declined. This incident aptly illustrates the tone of the local market. Northern irons are without change in price, either for delivery this year or in 1908. Sentimentally, they are weaker, but there has been no demand in the week under review to properly test the market. We have revised our prices, and quote as follows, the maximum southern prices being for third quarter, and the minimum for fourth quarter. Northern quotations are for the entire half.

Lake Superior Charcoal	$27.00 to 27.25
Northern Foundry No. 1	25.00 to 25.50
Northern Foundry No. 2	24.50 to 25.00
Northern Foundry No. 3	24.00 to 24.50
Southern Foundry No. 1	23.85 to 24.35
Southern Foundry No. 2	23.35 to 23.85
Southern Foundry No. 3	22.85 to 23.35
Southern Foundry No. 4	22.35 to 22.85
Southern No. 1 Soft	23.85 to 24.35
Southern No. 2 Soft	23.35 to 23.85
Southern Gray Forge	21.85 to 22.35
Southern Mottled	21.35 to 21.85
Southern Silveries, 4 per cent silicon	24.85 to 25.85
Southern Silveries, 5 per cent silicon	25.85 to 26.85
Southern Silveries, 6 per cent silicon	26.85 to 27.85
Jackson Co. Silveries, 6 per cent	29.40 to 29.90
Jackson Co. Silveries, 8 per cent	30.40 to 30.90
Jackson Co. Silveries, 10 per cent	31.40 to 31.90
Malleable Bessemer	25.00 to 25.50

Billets and Rods.—Another quiet week has passed. The 15,000-ton inquiry mentioned last week has not yet been closed. Another large tonnage of rolling billets has come up for figures. There is a good demand for wire rods, especially from chain makers, but little business is done because of the difficulty to secure satisfactory deliveries. We quote forging billets $36 to $38 Chicago; Bessemer rolling billets, $30 Pittsburg, and wire rods at $37 Pittsburg for

Bessemer, and $38 for open-hearth.

Merchant Bars.—The movement in steel bars is of healthy proportions. Implement interests are specifying freely against their contracts, and new business is remarkably heavy. Mills are being pressed for shipments, and quite a few consumers are anticipating their contract quotas. New tonnage in bar iron is sluggish, but the market is holding up well. All the leading manufacturers maintain that they are holding prices to the level of 1.60c Pittsburg. Shafting is weak and prices are shaded. Our quotations below are on car load lots, Chicago delivery:

Bar iron, 1.73c to 1.78c; soft steel bars and bands, 1.78c, half extras; soft steel angles, less than 3 x 3, 1.88c; hoops, 2.18c base, full extras; planished or smooth finished tire steel, 1.98c; iron finish, up to 1½ x ½ inch, 1.93c base; iron finish, 1½ x 1½ inch and larger, 1.78c base; channels for solid rubber tire, ¾ to 1 inch, 2.28c, and 1⅛ inch and larger, 2.18c; smooth finished machinery steel, 2.18c; flat sleigh shoe, 1.83c; concave and convex sleigh shoe, 2.08c; cutter shoe, 2.36½c; toe calk steel, 2.33c; railway spring, 1.98c; crucible tool steel, 7c to 9c, with higher prices asked on special grades. Quotations on shafting are irregular, 50 and 10 per cent off on the list being offered on carload business, and 50 and 5 for less than carload lots. On iron and steel bars from local stocks, we quote as follows: Bar iron, 2.25c full extras; soft steel rounds, and square, 3-inch and larger, $2 per 100 base; flats, 2 inches to 4 inches by ⅛ inch and larger, $2 per 100 pounds base; 4½ inches by 5 inches and 6 inches by 5-16 inch and thicker, $2 per 100 pounds base; all ovals, half rounds, $2 per 100 pounds base; steel bands, $2 half extras; soft steel hoops, $2.50 full extras. Other sizes not mentioned above, $2 per 100 pounds base plus half extras.

Plates.—The Illinois Steel Co. has closed for the steel for another boat, making a total of 10 on its books. Another boat is pending, which is expected to be closed this week. Specifications on contracts for all sizes of plates are very heavy, and only late deliveries can be secured from the Steel Corporation. Car builders and railroads are the heaviest consumers, though a round tonnage emanates weekly from boiler manufacturers and fabricating interests. The principal specifications received are from the Davenport car builder, which has the contract to build 1,000 all-steel cars for the Burlington railroad. The manufacture of these has already been commenced. Prices are without change as follows:

Plates, ¼ inch and heavier, 6¼ to 100 inches wide, either universal or sheared, 1.70c to 1.90c Pittsburg base. For extras see Pittsburg report. Freight rate to Chicago, 18c per 100 pounds for carload lots, and 21c for less than carload lots. Jobbers' prices for shipment from local stocks are as follows: Tank steel, ¼ inch and heavier up to 72 inches wide, 2.20c; 3-16 inch up to and including 60 inches wide, 2.30c; 3-16 inch, 72 inches wide, 2.55c; No. 8 up to 60 inches wide, 2.50c. Flange steel, 25c extra; heads, 25c extra.

Sheets.—The inability of the American Sheet & Tin Plate Co. to ship blue annealed sheets within 22 weeks from date has enabled other manufacturers not so crowded to secure premiums for prompter shipments of these heavy gages. On box annealed and galvanized sheets, the Steel Corporation is sold up for periods ranging from 16 to 20 weeks, but deliveries can be secured from local mills within six to eight weeks. Prices are without change as follows:

Black sheets, Nos. 8, 9 and 10, 1.90c Pittsburg; No. 28, 2.60c Pittsburg. Galvanized sheets, No. 28, 3.75c Pittsburg. Freight to Chicago, 18c per 100 pounds for carload lots, and 21c for less than carload lots. Jobbers' prices on carload lots and less from store are as follows:

No. 10, 2.50c to 2.55c; No. 12, 2.55c to 2.60c; No. 14, 2.60c to 2.65c; No. 16, 2.70c to 2.80c; Nos. 18-20, 2.80c to 2.90c; Nos. 22-24, 2.85c to 2.95c; No. 26, 2.90c to 3c; No. 27, 2.95c to 3.05c; No. 28, 3.05c to 3.15c; No. 30, 3.35c to 3.45c. Galvanized sheets, No. 10 to 20, 3.50c to 3.55c; Nos. 22 and 24, 3.65c to 3.75c; No. 26, 3.85c to 3.90c; No. 27, 4.05c to 4.15c; No. 28, 4.25c to 4.35c; No. 30, 5.40c to 5.45c.

Structural Steel. — Specifications against mill contracts are very active, one received this week amounting to nearly 7,000 tons. There is a good volume of new business, sufficient to keep the local mill filled up two months ahead. Fabricators report an active demand for material to enter into small buildings, but nothing of a large nature has come up this week. The specifications for three new depots to be erected in Chicago by the Northwestern, Milwaukee and Terminal roads are expected in about two months, and it is believed that contracts for the material will be let this year. We quote as follows:

Beams and channels, 3 to 15 inches inclusive, 1.70c Pittsburg. For extras see Pittsburg report. Freight rate from Pittsburg to Chicago, 18c per 100 pounds for carload lots, and 21c per 100 pounds for less than carload lots. Quotations from store are as follows:

All angles, three inches and larger, including six inches, $2.10 per 100 pounds; angles, over six inches, $2.15 per 100 pounds base; beams, 3 to 15 inches inclusive, $2.10 per 100 pounds base; channels, three inches and larger, $2.10 per 100 pounds base. Less than carload lots are $1 a ton higher than foregoing prices.

Rails and Track Supplies.—Two rail contracts which have been held up for several weeks pending the completion of financial arrangements have been placed with the Lackawanna Steel Co. in the past week. One contract is from a western steam road for 11,000 tons of heavy sections, and the other is from a traction enterprise and for 6,000 tons. Both orders specify deliveries to be commenced this year. Light rails are active and strong in price. The brisk movement noted last week in track supplies continues undiminished. We quote as follows:

Bessemer rails, $28 to $30; less than 500-ton lots, $32; open-hearth rails, $29; light rails, Bessemer, 30 to 45-pound sections, $34; 25-pound, $35; 20-pound, $36; 16-pound, $37; 12-pound, $38, and lighter sections down to 8-pound, $44.50, all f. o. b. mill. Track supplies vary in price according to quantity and delivery. On orders accompanying rail contracts for future delivery, we quote, f. o. b. Joliet: Angle bars, 1.65c; spikes, 2.25c; bolts with square nuts, 2.65c; with hexagon nuts, 2.80c. For carload lots or less, for prompt shipment, the following prices are asked: Angle bars, 2.25c to 2.75c; spikes, 2.40c to 2.50c; bolts with square nuts, 2.85c; with hexagon nuts, 3c.

Cast Iron Pipe.—Contracts have been closed this week by the leading producer for an aggregate of 2,000 tons, of which 600 tons was for the town of Coleraine, Minn. There is a good routine demand for repairs and small extensions. Prices are well maintained as follows: Four-inch water pipe, $38.60; 6 to 12-inch, inclusive, $37.60; gas pipe, $1.00 a ton higher.

Merchant Pipe and Boiler Tubes.—New tonnage and specifications are without diminution. Deliveries from mills are so far behind that current business more than offsets the gain made by shipments. Store stocks are low, and stiff prices are asked by jobbers. We quote mill discounts, Chicago delivery, carload lots, as follows. On steel pipe jobbers are allowed a concession of one point and five per cent additional from the schedule in force.

MERCHANT PIPE.

	—Steel—	
	Black.	Galv.
¼ to 6 inches, inclusive.....	71.2	.61.2

BOILER TUBES.

	Steel.	Iron.
2¼ to 5 inches, inclusive....	62.2	49.2

Mill quotations on iron pipe are from four to five points higher than above. A concession of one point from the following quotations is allowed by Chicago jobbers on carload orders for shipment from local warehouse stocks. We quote for less than carload lots as follows:

MERCHANT PIPE.

	Black.	Galv.
⅛ to ¼ inch.....	60	44
⅜ inch	62	48
½ inch	64	57
¾ to 6 inches.....	68	58
7 to 12 inches.....	64	49

Minimum prices for wrought iron pipe, carload lots or greater, from Chicago stocks, are as follows: ⅛ inch to ¼ inch, 55; ⅜ inch, 57; ½ inch, 59; ¾ inch to 6 inches, 64; 7 inches to 12 inches, 59. Boiler tubes from store are unchanged at 60 off for steel, 47½ for iron, and 42½ for seamless, base sizes, 2¼ inches to 5 inches.

Wire Products.—The leading interest reports that fall contracts are being closed in satisfactory volume. During the slight recession in the past six weeks, the company considerably overtook its delinquent deliveries, and now can give shipments of wire nails in two weeks. Smooth wire is moving actively. In view of the enormous demand with which the company has had to contend all year—its sales every day since Jan. 1 averaging 1,000 tons greater than the daily sales of a year ago—the wonder is that shipments are as well caught up as they are. Quotations to jobbers are without change, as follows:

Wire nails, $2.18; painted barb wire, $2.33; galvanized barb wire, $2.63; smooth annealed wire, $2.03; smooth galvanized wire, $2.33; polished staples, $2.28; galvanized staples, $2.58. Carload lots to retailers, five cents higher; less than carload lots, 15 cents higher.

Coke.—The volume of business is without material change, but the tone of the market is greatly improved. This is attributed to the decrease in production. Foundry coke is offered for spot shipment at $3.10 to $3.25 ovens, and on contract at $3.15 to $3.30 ovens.

Old Material.—There were a few changes in scrap iron this week. Rerolling rails have declined to a minimum of $17; dealers' forge to $12; borings to $9; stove plate to $14.25 and splice bars to $16.50. There is neither life nor strength to the local market, and trades can be closed only at the expense of concessions. Buyers are looking for bargains, and unless the offer is attractive from the cost standpoint, it does not interest the local trade. As a general thing, the large consumers in this market are carrying large stocks either in their yards or on contract, and it is not expected that such firms as the Republic, Interstate, Griffin, Crane Co. and the local open-hearth interests will be active buyers for another 60 or 90 days. An aggregate of 6,400 tons is offered this week in railroad lists, as follows: Wisconsin Central, 400 tons; Missouri Pacific, 900 tons; Santa Fe, 2,500 tons; Great Northern, 2,000 tons, and the Northwestern, 625 tons. We have revised our prices and quote gross tons in the first paragraph as follows:

Old Car Wheels.....	$24.50 to 25.00
Old Iron Rails.....	21.50 to 22.00
Re-rolling Rails (3 ft. and over)	17.00 to 17.50
Old Steel Rails (3 ft. and under)	17.00 to 17.50
Light Section Relayers, 45 lbs. and under, subject to inspection...	30.00 to 32.00
Relaying Rails, subject to inspection	28.00 to 30.00
Frogs, Switches, and Guards...	15.75 to 16.00
Heavy Melting Steel.....	15.50 to 16.00

We quote net tons as follows:

No. 1 R. R. Wrought.....	$14.75 to 15.25
No. 2 R. R. Wrought.....	13.75 to 14.25
Knuckles, Couplers and Springs.	15.00 to 15.50
Shafting	17.00 to 17.50
Dealers' Forge No. 1.....	12.00 to 12.50
Pipes and Flues.....	11.50 to 12.00
No. 1 Cast, 150 lbs. and less...	17.25 to 17.75
No. 1 Mill	10.25 to 10.75
Mixed Busheling (Nos. 1 and 2)	10.75 to 11.25
Country sheet	8.00 to 8.50
No. 1 Boiler Cut.....	11.00 to 11.50
Boiler Punchings	14.50 to 15.00
Cast Borings	9.00 to 9.50
Mixed Borings, etc.....	9.00 to 9.50
Machine Shop Turnings.....	10.75 to 11.25
Railroad Malleable	16.00 to 16.50
Agricultural Malleable	15.00 to 15.25
Stove Plate and Light Cast Scrap	14.25 to 14.75
Old Iron Splice Bars.....	16.50 to 17.00

CLEVELAND

Ore Figures Show Less Decrease Than Predicted—Coke Prices Stiffened.

Office of THE IRON TRADE REVIEW,
Browning Bldg., August 6.

Iron Ore.—Complete ore figures for the month of July, while showing a large decrease on account of the strike troubles at the head of the lakes, do not exhibit a slump in shipments of the extent freely predicted. The total shipments of the month were 4,849,117 tons against 5,762,772 in July, 1906, a decrease of 913,655 tons. To date however the aggregate figures are in advance of the season of 1906, with totals respectively of 17,534,741 and 17,004,368, or a gain of 530,373 tons in favor of the present year. The large falling off of tonnage in July, resulting from the strike at Superior, Duluth and Two Harbors was in a measure offset by the splendid records made by Escanaba, Marquette and Ashland, all of which showed decisive gains. The shipments by ports were as follows:

	July 1907.	Per cent of Total.	July 1906.	Per cent of Total.
Escanaba	988,664	20.39	827,097	14.35
Marquette	580,746	11.97	451,807	7.84
Ashland	657,750	13.57	490,596	8.51
Superior	762,753	15.73	917,761	15.93
Duluth	1,057,319	21.80	1,801,096	31.26
Two Harbors	801,885	16.54	1,274,415	22.11
Total	4,849,117	100.00	5,762,772	100.00
	To Aug. 1, 1907.	Per cent of Total.	To Aug. 1, 1906.	Per cent of Total.
Escanaba	2,812,879	16.05	2,565,505	15.09
Marquette	1,349,805	7.69	1,254,794	7.38
Ashland	1,707,107	9.73	1,679,359	9.88
Superior	3.081,664	17.58	2,671,536	15.71
Duluth	5,151,365	29.38	4,982,331	29.30
Two Harbors	3,431,921	19.57	3,850,943	22.64
Total	17,534,741	100.00	17,004,368	100.00

Pig Iron.—Prompt iron continues to attract the greater part of buyers' attention at the present time, and most of the sales of the past week have been of this variety. A decided increase in this class of buying is noted through some sellers, and of 1,000 tons sold by one interest in the week, practically the entire amount consisted of prompt iron, disposed of on the basis of $23, valley furnace for No. 2 foundry. Sales of spot malleable are also noted. The orders of the week have been of the filling in sort, and this is believed to foreshadow an active buying movement in the near future, as stocks of foundry yards are thought to be light. Some inquiry for the first quarter 1908 foundry iron is being made. Despite an occasional unfavorable report, foundry business is holding up fairly well, and in some cases requirements have been underestimated and shipments on contracts are being anticipated. Bessemer iron remains decidedly firm and basic is quiet. We quote prices unchanged f. o. b. Cleveland as follows, the higher quotations being for third quarter delivery and the lower for fourth quarter.

Bessemer	$23.40 to 23.50
No. 1 Foundry.....	23.50 to 24.00
No. 2 Foundry.....	23.00 to 23.50
No. 3 Foundry.....	22.50 to 23.00
No. 2 Southern.....	23.85 to 24.85
Gray Forge	22.00 to 22.25

Coke.—A general stiffening of the market has become apparent within the past week and prices are somewhat higher, one interest declining to sell standard grade foundry coke for less than $3.25. Spot coke remains exceedingly scarce, and sellers are receiving plenty of inquiries for such tonnage. We quote furnace coke for last half delivery at $2.50 to $2.75 and foundry from $3.25 to $3.50.

Finished Material.—A sale somewhat out of the ordinary made in the current week has been that of a lot of steel ties for experimental purposes to the Northern Ohio Traction Co. The ties will be laid over a mile of the line and if they afford satisfactory service, a good market is expected to be the result. There is an increasing demand for steel piling, and inquiries for 1,000 tons are pending for government and city dock work and also for business building purposes. The prospects are that three or four additional lake vessels, including one at Port Huron and one at Cleveland, will shortly be ordered. The cutting of prices in standard railroad spikes continues, and considerable business was taken in the current week on a basis of $2.00 per hundred pounds to jobbers in carload

lots, compared with the price of $2.20 which prevailed but a short time ago. Boat spikes are holding firm. Another transaction in spikes recently closed has been the order accompanying a sale of 1,800 tons of rails for a Michigan traction line. An inquiry for 2,000 or 3,000 tons of plates for delivery in November and December and the first quarter of 1908 is pending subject to the willingness of the mill to accept the order under the conditions of delivery. A Michigan traction line is also in the market for 1,300 tons of rails. Warehouse trade by jobbers is good, but mill business is at a minimum. Structural steel continues in strong demand.

Old Material.—Little buying of any sort is under way and a lifeless state is prevailing. However, the Pennsylvania lines west, which closed during the week on a lot of 4,000 tons, were enabled to obtain good prices for their accumulation, but this is believed to have been caused by the mills bidding in a greater portion by the tonnage direct in competition with dealers. The material awarded to local dealers was secured at rather stiff prices, considering the state of the market. On the other hand, the sales by the Erie railroad were at lower quotations than the preceding month. Among the new railroad lists in the field are the Big Four, with about 2,000 tons; the Wheeling & Lake Erie with 700 tons and the C. H. & D. with 800 tons. We quote prices unchanged f. o. b. Cleveland, gross tons, as follows:

Old iron rails	$22.50 to 23.50
Old steel rails (re-rolling)	17.50 to 18.50
Old steel rails (under 6 feet)	17.50 to 18.50
Old car wheels	22.50 to 23.50
Steel boiler plate	14.00 to 14.50
Steel axles	21.50 to 22.50
Malleable iron (railroad)	18.25 to 18.75
Malleable iron (agricultural)	16.00 to 16.50
Heavy steel	16.00 to 16.50
Country mixed steel	14.75 to 15.25
Low Phosphorus	21.50 to 22.50

We quote net tons as follows:

No. 1 R. R. wrought	$16.50 to 17.00
No. 1 busheling	14.25 to 14.75
No. 1 machine cast	18.00 to 19.00
Iron axles	25.00 to 26.00
Axle turnings	13.50 to 14.00
Machine shop turnings	12.00 to 12.50
Grate bars	14.50 to 15.00
Pipes and flues	13.00 to 14.00
Tank iron	12.50 to 13.50
Hoop and band iron	8.50 to 9.00
Sheet iron	7.50 to 8.50
Wrought drillings	12.00 to 12.50
Stove plate	14.50 to 15.00
Cast borings	10.75 to 11.25

CINCINNATI.

Market Extremely Quiet, But Buying Movement is Expected.

Office of THE IRON TRADE REVIEW,
124 Government Place, Aug. 7.

Pig Iron.—But little change can be noted in the market compared with a week ago. The inquiry is confined to scattering carload lots mostly for No. 2 foundry. The low grades are dull and lifeless. Sales are mainly $20.50 Birmingham for southern iron and $23.00 furnace for the little Ironton district iron coming out. We quote for prompt delivery, delivered Cincinnati, as follows:

Southern Foundry No. 1	$24.25 to 24.75
Southern Foundry No. 2	23.75 to 24.25
Southern Foundry No. 3	23.25 to 23.75
Southern Foundry No. 4	21.25 to 21.75
Southern No. 1 Soft	24.25 to 24.75
Southern No. 2 Soft	23.75 to 24.25
Southern gray forge	20.25 to 20.75
Northern No. 1 foundry	24.70 to 25.20
Northern No. 2 foundry	24.20 to 24.70
Northern No. 3 foundry	23.70 to 24.20

There is no inquiry of any consequence for forward delivery. The situation seems to be one of standstill and waiting. There is but little iron offered and no stocks, therefore, pressing for sale. The ore strike is regarded as a strengthening element in the market, but buyers do not respond to any of the features that would serve to induce buying. It is believed in some quarters that a buying movement is not unlikely in the near future and the purchasing, it is thought, will come from melters who are not fully covered for the last half of the year. On all sides it is recognized that any amount of buying at this time would have its effect on prices, as there is not enough unsold tonnage to meet a call for iron of even moderately large proportions. It was just one year ago that the big buying movement set in that sent prices up to the high level that they reached during 1906. These factors have a tendency to make furnaces firm holders of the comparatively small tonnage they have yet for sale during the balance of this year. On the other hand, buyers feel that prices are too high and are not inclined to cover for future requirements at this time. The price of spot iron has already declined $2.50 per ton and this makes the buyer regard the possibilities of the market as in his favor. We quote for last quarter delivery, delivered Cincinnati, as follows:

Southern Foundry No. 1	$22.75 to 23.25
Southern Foundry No. 2	22.25 to 22.75
Southern Foundry No. 3	21.75 to 22.25
Southern Foundry No. 4	21.25 to 21.75
Southern Foundry No. 1 Soft	22.75 to 23.25
Southern Foundry No. 2 Soft	22.25 to 22.75
Gray Forge	20.25 to 20.75
Northern Foundry No. 1	23.70 to 24.20
Northern Foundry No. 2	23.20 to 23.70
Northern Foundry No. 3	22.70 to 23.20

Finished Material.—There is a fair run of orders for materials from stock and prices are unchanged. Mill orders are comparatively quiet. Small orders are filled here at the following prices:

Angles, 3 x 3 and over, 2.15c to 2.25c; beams and channels, 15 inches and under, 2.15c; small angles and architectural channels, 2.10c base; plates ¼ inch and heavier, 2.10c; 3-16 inch 2.20c; No. 8, 2.20c; sheets (blue annealed) No. 10, 2.30c; No. 12, 2.35c; No. 14, 2.40c; No. 16, 2.50c; box annealed sheets, Nos. 18 and 20, 2.65c; Nos. 22 and 24, 2.75c; Nos. 25 and 26, 2.80c; No. 27, 2.85c; and No. 28, 2.95c. Iron and steel bars, 2.00c base; boiler tubes, 62 per cent off base; turnbuckles, 45 per cent off; rivets, 3.15c base; cold rolled shafting, 45 per cent off list; steel tire, 2.10c base.

Coke.—The market is unchanged. Prices are about the same as a week ago. There is some inquiry for contract coke from foundry interests which have not fully covered. Spot furnace coke is irregular, but not quotably lower. Prices in the leading coke producing districts are as follows:

Wise County, Va., Furnace Coke, prompt shipment	$2.25 to 2.35 per ton
Wise County, Va., Foundry Coke	3.00 to 3.25 per ton
Pocahontas Furnace Coke, prompt shipment	2.50 to 2.65 per ton
Pocahontas Foundry Coke	3.00 to 3.25 per ton
Connellsville Furnace Coke, prompt shipment	2.40 to 2.50 per ton
Connellsville Foundry Coke	2.90 to 3.50 per ton
New River Foundry Coke, prompt shipment	3.00 to 3.50 per ton
New River Furnace Coke, contract	2.65 to 2.75 per ton

Old Material.—The market continues dull, but is not quotably changed, as there is but little trading on which to establish prices. We quote, f. o. b. Cincinnati, as follows:

Old No. 1 R. R. wrought net tons	$16.00 to 17.00
Cast machine and f'dy, net tons	19.00 to 19.50
Old iron rails, gross tons	24.00 to 25.00
Old steel rails (re-rolling) gross tons	18.00 to 19.00
Old short lengths, gross tons	19.00 to 20.00
Old iron axles, net tons	26.50 to 27.00
Heavy melting scrap, gross tons	18.00 to 19.00
Stove plate, net tons	14.00 to 15.00
Wrought turnings, net tons	13.00 to 13.50
Cast borings, net tons	10.00 to 11.00
Car wheels, gross tons	23.50 to 24.50

PHILADELPHIA.

Extreme Dullness in Pig Iron Still Prevails—Scrap Tends Downward.

August 6.

Pig Iron.—Intense dullness still rules, and inquiries, rather than orders, indicate the state of the market. Some pretty big consumers have been feeling their way toward purchasing, but the prices they have named have not been satisfactory to producers, and negotiations have not been closed. With the exception of some mills, consumption shows no decrease, and it is only a matter of a few weeks before many buying orders will have to be placed. In view of this fact, and because prices have already fallen to a point that allows only a moderate profit to the furnace men, it is believed that quotations have pretty nearly reached rock bottom. In the absence of buying it is difficult to give them with much precision, but it is hardly fair to give prices for inferior irons a market quotation. In this connection producers deny that good gray forge is selling as low as $19.50, as has been reported. Sales were made last week

at $20.50 to $20.85 for standard brands. Prices continue to show a shading tendency and may be quoted as follows:

No. 1X Foundry	$23.25 to 24.00
No. 2X Foundry	22.25 to 23.00
No. 2 Plain	21.75 to 22.25
Standard Gray Forge	20.50 to 21.00
Basic	21.50 to 22.00
Low Phosphorus	27.00 to 27.50

Finished Material.—There is a very fair volume of new business coming in all the time, and if it was not for the unnatural pace set in the last year, the trade would be considered in a very satisfactory condition. Structural material and steel bars seem in especially good demand. Bar iron continues to drag, though some firms report an improvement. Prices, which show little change, may be quoted as follows: Beams, channels and angles, according to specifications, 1.85c to 1.90c; refined iron bars, 1.80c to 1.85c; steel bars, 1.75c to 1.85c; plates, 1.85c to 1.90c.

Old Material.—The tendency is still downward, but there is very little buying by the mills at the reduction. Embargoes have generally been raised. Prices may be quoted as follows:

Old steel rails	18.00 to 18.50
No. 1 steel scrap	17.25 to 17.75
Old steel axles	20.00 to 21.00
Old iron axles	27.00 to 28.00
Old iron rails	21.00 to 22.00
Old car wheels	22.00 to 23.00
Choice scrap R. R. No. 1 wrought	18.50 to 19.00
No. 1 yard scrap	17.00 to 17.50
Machinery scrap	19.00 to 20.00
Low phosphorus scrap	22.50 to 23.00
Wrought iron pipe	15.50 to 16.00
No. 1 forge fire scrap	16.00 to 16.50
No. 2 forge fire scrap, ordinary	10.50 to 11.50
Wrought turnings	14.50 to 15.00
Axle turnings, heavy	15.00 to 15.50
Cast borings	13.50 to 14.00
Stove plates	14.50 to 15.00

NEW YORK.

Pig Iron Dull and Prices Lower—Large Business of American Bridge Co.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St., Aug. 6.

Pig Iron.—Barring a few inquiries of considerable size, the market in this district is inactive. Developments of the past fortnight have established prices on a lower level than has prevailed throughout the summer and the belief is general that the decline will go still further, though no radical change is looked for and no disastrous prices are expected to result. Traveling salesmen covering New England and that territory adjacent to New York report some complaint among foundrymen that orders now in sight will not keep their plants in full operation far in the future, and this condition, coupled with the belief that later purchases will secure more satisfactory prices, is resulting in current buying being restricted to immediate and early requirements only. A steam pump interest, which last week took 1,000 tons of foundry iron at a low figure, is still in the market for some 3,500 tons and will close shortly. Another local melter will purchase a like amount for the fourth quarter. Until these inquiries are placed, it is difficult to make an accurate quotation on forward iron. British stocks, July 25, were down to 218,000 tons in Connal's yards, a decrease during the week of 12,000 tons, chiefly for continental account. The stocks of the Corporation have also decreased heavily of late, but, with the exception of the Pittsburg purchase reported last week, no outside iron has been bought. During the week a cargo of Chinese iron has been received at this port and already about half of the 2,500 tons has been disposed of at a good figure. This is a chilled cast iron of remarkable analysis, running 0.75 in silicon, 0.02 in phosphorus, 0.02 in sulphur and 2.50 to 3.00 in manganese. Revised quotations at tidewater, early or forward delivery, are as follows:

Northern Foundry No. 1	$23.00 to 23.50
No. 2X Foundry	22.25 to 22.75
No. 2 Plain	21.75 to 22.25
No. 2 Southern Foundry	23.50 to 25.00
Basic	21.50 to 22.00

Ferro-Manganese.—There is little change in the local situation and current business continues on the basis quoted a week ago, $62.00 seaboard, with no notable transactions.

Finished Material.—Independent interests have figured largely in the securing of structural contracts let during the past week. The center of local interest has been the Edison power plant, probably requiring about 10,000 tons of steel, which has been let to the J. B. & J. M. Cornell Co., which will fabricate the steel. The Chelsea piers, as mentioned a week ago, have gone to Snare & Triest and the Hay Foundry, the tonnage involved being about 7,000. The McClintic-Marshall Construction Co. has taken a 1,000-ton extension for the plant of the General Electric Co. at Pittsfield, and it is reported that the Phoenix Bridge Co. will furnish 16,000 tons of materials for the Southern railway. The Pittsburg Steel Co., it is understood, will supply about 5,000 tons for a large steel foundry at Bay City, Mich. The Devoe-Reynolds building Brooklyn will call for a fair tonnage and pier work yet to be let will involve some 10,000 tons additional.

Official announcement is made that the American Bridge Co. will furnish the 20,000 tons of steel needed for the completion of the Pennsylvania terminals, this being an unfilled Milliken contract. With this start, the Bridge company expects an August tonnage about equal to that of July, 46,000 tons, which with one exception makes the largest in its history. So far this year the Bridge company has taken about 320,000 tons, which is about half of the country's lettings. Specifications are plentiful and all its plants are scheduled to capacity through the year. An output of 60,000 tons, considerably above its rated capacity, is looked for during August.

In other finished lines the tendency is generally easier. Premium business on plates is gradually disappearing and there are persistent reports that 1.65 Pittsburg can be done on bar iron. The completion of Milliken contracts has called for considerable tonnages of shapes and plates and local bookings have been good. In other directions there is little change.

We quote: Angles, 3 to 6 inches x ¼ inch and heavier, 1.86c; beams, 3 to 15 inches, 1.86c; tees, 3 x ¼ and heavier, 1.91c; plates, carloads, tank, 1.96c; marine boiler, 2.26c; bar iron, 1.86c; soft steel bars, 1.76c; sheets, No. 28, black, 2.60c.

Old Material.—Inquiry for scrap material is limited, particularly so far as rolling mill stock is concerned. The embargoes prevailing for some time at important Pennsylvania consuming points have been lifted and steel scrap is commencing to move forward, but the demand is not brisk and the supply is ample. Cast iron scrap shows a surprising weakness in view of its scarcity, but this is explained by the prompt delivery of pig iron. Similarly, stove plate is scarce but weak in price. There is no lack of current business, but orders are generally small and there is no snap to the market. We quote New York delivery, gross tons, as follows:

Old iron rails	$24.50 to 25.00
Old steel rails, rerolling	18.00 to 18.50
Relaying rails	27.00 to 27.50
Old car wheels	23.50 to 24.00
Old iron car axles	27.50 to 28.00
Old steel car axles	19.00 to 19.50
Heavy melting steel	15.00 to 15.50
No. 1 railroad wrought	17.00 to 17.50
Iron track scrap	16.00 to 16.50
Wrought pipe	13.00 to 13.50
Cast borings	12.50 to 13.00
Wrought turnings	13.00 to 13.50
Heavy cast scrap	17.00 to 17.50
Railroad malleable	16.50 to 17.00
Agricultural malleable	15.00 to 15.50
Stove plate	14.50 to 15.00
Grate bars	13.00 to 13.50

BUFFALO.

Pig Iron Market Dull with Slight Increase in Business.

August 6.

Pig Iron.—Very little change has taken place in the pig iron market here this week. It continues dull, but with slightly increasing business, although not of a character to make any perceptible change in the general market conditions. A few sizable inquiries have come into local iron offices which some believe to be an indication of stronger trade. No radical changes in conditions, however, are looked for at any early time, it being generally conceded that the quiet of the summer season will linger for some time.

Sales of the past week have been few

and scattering, mostly of small tonnage in No. 2 foundry iron. Several orders have been taken for 500-ton lots for delivery during last quarter at standard prices. The products of the furnaces are moving out rapidly and shipments continue catching up with orders, which is considered an indication of a healthy market.

We quote for last quarter deliveries as follows:

No. 1X Foundry	$23.75 to 24.00
No. 2X Foundry	23.00 to 23.50
No. 2 Plain	22.50 to 23.00
No. 3 Foundry	22.75 to 23.00
Malleable Bessemer	23.00 to 23.50
Gray Forge	22.00 to 22.50
Charcoal	27.00 to 27.50

ST. LOUIS.

Slight Improvement in Pig Iron—Coke More Active—Scrap Weak.

August 5.

Pig Iron.—Buying was a little more brisk last week than during the preceding week, although no large orders were placed. A majority of orders and inquiries call for prompt shipment. There is a scarcity of No. 1 soft, and a premium of 50 cents a ton on that grade doubtless could be obtained if the iron were actually en route. The present price for No. 2, Birmingham basis, for spot shipment, is $20.50. The last quarter is quoted at $19.50 to $20, f. o. b. Birmingham, and the first quarter and half remain firm at $18.50. Our quotations for spot iron, f. o. b. Birmingham, to which the freight of $3.75 is to be added, follow:

No. 1 Southern	$21.00 to 21.50
No. 2 Southern	20.00 to 21.00
No. 3 Southern	19.50 to 20.00
No. 4 Southern	19.00 to 19.50

Coke.—Considerably more business was done last week than during the week preceding in foundry and furnace coke. Orders aggregating 3,600 tons of furnace coke, for shipment over the next three weeks were booked late yesterday by DeCamp Bros. & Yule Iron, Coal & Coke Co. Some foundrymen are showing a strong inclination to buy coke for shipment over the first quarter of 1908, and a round tonnage order may be booked within the next two weeks. Connellsville 72-hour coke is still quoted at $3.35 to $3.60 f. o. b. ovens, with a freight rate of $2.80 to East St. Louis, and $2.90 to St. Louis. Virginia furnace coke is offered for $2.25, but for immediate shipment only, and at $2.75 on contract. The freight rate from Virginia ovens is $2.60 to East St. Louis; $2.70 to St. Louis, and $2.40 for business destined beyond.

Finished Material.—There was a marked increase in inquiries for standard rails last week, resulting in five small orders aggregating 4,000 tons to the leading interest. Steel bars are still in good demand, and specifications against contracts are liberal. New business is reported light, owing to the vacation season. Light rails are in good demand, and spikes are about normal.

Old Material.—The market is reported dull beyond redemption until after the hot weather, with considerable decline in some prices for some grades. Our quotations follow:

	GROSS TONS
Second-hand Relaying Rails, according to time of delivery	$29.00
Steel rails (less than 3 feet)	15.00
Car wheels	21.00
Iron rails	22.00
Re-rolling steel rails	16.00
Heavy melting steel	15.00
Country steel mixed	12.00
	NET TONS
No. 1 R. R. wrought	$15.00
No. 2 R. R. wrought	14.00
Iron splice bars and fish plates	16.00
Iron car axles	22.00
Steel car axles	19.00
Iron shaftings (3 to 6 inches)	18.00
Country wrought	12.00
Locomotive tires, smooth inside	15.00
Pipes and flues	12.00
Heavy machinery	15.00
R. R. cast (less than 300 pounds)	14.50
No. 1 Busheling	13.00
No. 2 Busheling	12.00
Boiler sheet and rings	12.00
R. R. cast borings (free of inferior quality)	10.00
R. R. wrought turnings	13.50
Machine shop turnings (free from brass)	10.00
Railroad malleable	15.00
Agricultural malleable	14.00
Cast stove plate	11.00

BIRMINGHAM, ALA.

Rebuilt Philadelphia Furnace Blown In—Few Sales are Reported.

August 5.

The feature of the present week in the Alabama pig iron mart is the blowing in of the Philadelphia furnace of the Sloss-Sheffield Steel & Iron Co., at Florence, Ala., after months and months of work making repairs and adding new appurtenances, including a skip hoist. The furnace will have a daily capacity of about 250 tons of iron. Five other furnaces are under repairs in this state, but none of them will be ready for the torch until the end of this month, if then. The mart continues a little quiet. Some few round lots are selling, but they are far between. The small lot sales for delivery during the first half of the coming year are still noted and prices are firm. The 1908 iron is quoted at $18.50 per ton, No. 2 foundry iron. The only spot iron being dealt in is silvery gray, which is a little scarce, $23 per ton being charged for the product.

Humidity is charged with the large tonnage of low grade iron being produced. The output as a whole is not the best.

Positively no indication is noticeable in this district that there is to be a reduction in quotations any time in the near future. The manufacturers believe that there will be need for a large quantity of iron. Attention is called to the fact that considerable iron has already been sold for delivery during the first half of the coming year, while it was Sept. 15 last year before any iron was sold for delivery during the following year.

In steel there is no abatement of the activity which has been on many months now. Ground was broken last week for the two additional open-hearth furnaces at the new steel plant being erected at Ensley by the Tennessee Coal, Iron & Railroad Co. These will make the plant just twice the original size and, when all improvements in hand are completed, just three times as much steel will be produced as has been showing up at Ensley during the past few years.

BRITISH IRON MARKET.

Healthy Tone of Pig Iron—Steady Production of Stocks—Germans Buying.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., July 26.

The pig iron market this week has shown a decidedly healthier tone which has been manifest in stronger prices. A week ago the quotation was 56s 6d ($13.82) for Middlesbrough. Yesterday it was 58s ($14.20); and within the last few days 58s 6d ($14.32) has been touched. Apparently there is a "squeeze" in progress just now, which has somewhat disorganized the market. But yesterday's turnover at Glasgow was 14,500 tons. The stocks continue to steadily reduce, now being 228,748 tons, a reduction of 15,000 on the week. This is much below the diminution of a couple of months ago, but it needs no elaborate calculation to show that even if the present rate of consumption goes on, the stocks must entirely disappear within a few months. Germans are very good buyers, going far to replace the American purchases, which have now practically disappeared. Midland pigs are, if anything, stronger than they were a week ago, and concessions cannot be had except for very substantial contracts. A few consumers state that they are geting supplies a little bettter then they were, but generally speaking deliveries are much in arrear and quite a number of blast furnaces have enough orders to last them till Christmas.

A return of blast furnaces issued today shows that the total in blast on June 30 was 373 out of 514 built. There has been a decrease in the number in blast since March 2, seven having been

blown in and nine blown out. There are at present 54 being rebuilt or relined.

No doubt the meaning of the slight decrease is due to the enormous demand upon the furnaces, which has compelled some of them to give out before others are ready to take their place. Nine new furnaces are being built at present. The smelters still strongly complain of the dearness of coke, and, with the prospect of still higher miners' wages, refuse to listen to any overtures for concessions. In the Barrow-in-Furness district, two or three furnaces are rapidly being got ready for the production of hematite, and during the week stocks have been reduced by about 1,400 tons.

METAL MARKET.

NEW YORK.

August 6.

Copper.—The market continues stagnant, this condition resulting in constantly sagging prices without stimulating consumers to cover their requirements into the future. The market is full of rumors, but nothing of importance has developed during the past week and it now appears that with consumers well provided for the time being, the beginning of the long-expected buying movement is still remote. Lake is quoted at 20¾c to 21¼c; electrolytic at 20c to 20½c, and casting at 19¼ to 19¾c. London reports considerably lower prices.

Pig Tin.—Heavier offerings abroad have reflected themselves in a weaker local situation, with the market inactive and prices tending downward. Spot can now be had at about 40c with slightly lower figures offered for later delivery.

Pig Lead.—The demand is light and the local market dull, with desilverized at New York ranging from 5.15c to 5.25c. St. Louis reports sales as low as 5.00c.

Spelter.—Quotations this week are still lower, as the decline continues. We quote 5.85c to 5.90c for New York and 5.70c to 5.75c for St. Louis.

Antimony.—Conditions here are unchanged, with business exceedingly limited. We quote: Cookson's, 11c to 11½c; Hallett's, 10c to 10½c; ordinary brands, 9¾c to 10¼c.

ST. LOUIS.

Joplin, Mo., Aug. 5.

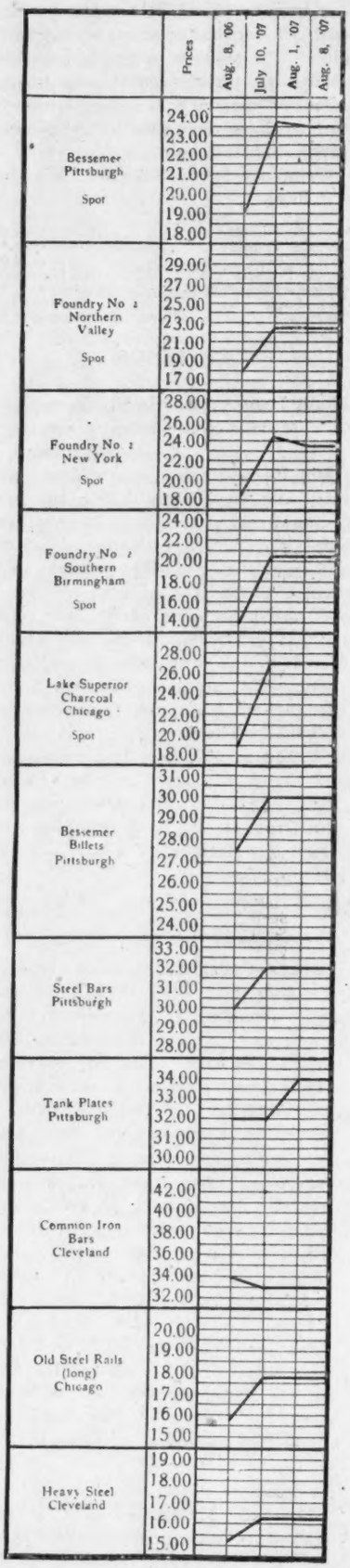
Lead and Zinc.—Many of the outlying camps in the Joplin district were searched for ore last week, but the shipments were nearly 1,000 tons short of the average. This condition was brought about by producers who have wearied of the slight reduction that has been made in zinc ore from week to week, and who declined to sell last week when lower offerings were made. The highest price of $50 remained, also the highest assay price of $47.50; however, a large amount of ore that has been selling on the higest assay price was listed at a 50 cent cut, to which exceptions were taken by the sellers. As low as $44 a ton of 60 per cent zinc was offered.

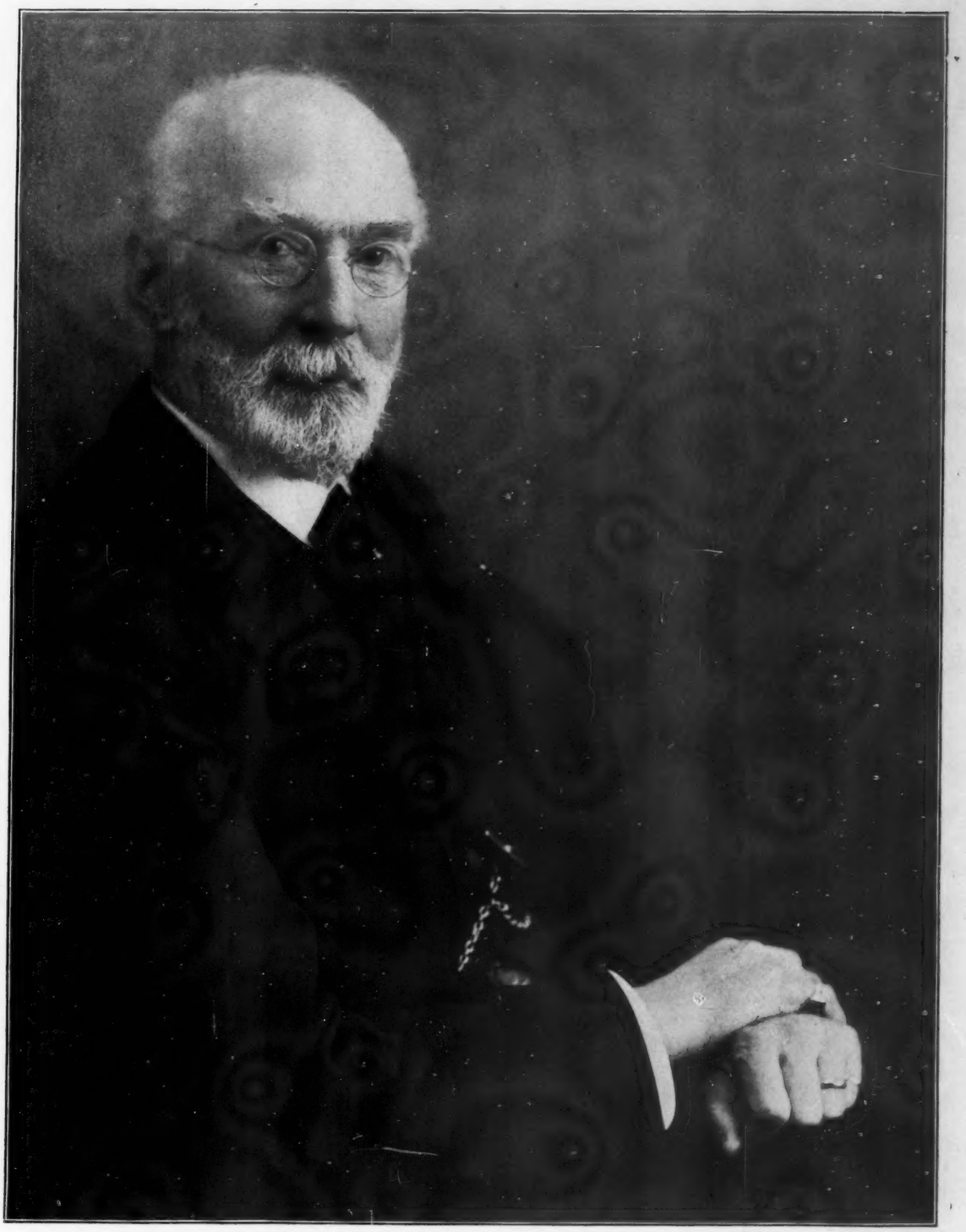
Lead prices are generally firmer, but ranging from $56 to $64 a ton.

Dynamite Foundry Addition.—By a mysterious explosion of what is thought to have been a charge of dynamite, a portion of the concrete foundation of the addition under construction to the Superior Foundry Co., Cleveland, was considerably damaged Aug. 6. The explosive had been placed directly under a steel girder that had been bolted to heavy concrete work, and a hole three feet across and six feet deep was torn out of the concrete support. Although the officers of the foundry company say they have received threats from time to time and several months ago police protection had to be summoned for the non-union structural iron workers employed on the building, they are unable to place the responsibility for the act and the authorities are investigating. The charge was placed by some one familiar with structural work.

Companies Consolidated.—The H. E. Mills Mfg. Co., Syracuse, N. Y., has been organized with ample capitalization to take over the dry core compound and foundry supply specialty business of the C. E. Mills Oil Co. of that city, and of the Buckeye Milling Co., of Cleveland. The directory board includes H. E. Mills, Thomas Wheatley, Herbert W. Smith, and Frank T. Miller, all of Syracuse, and Walter A. MacMullen, of New York. Mr. Mills is president, Mr. MacMullen vice president, M. A. Raus treasurer, and Ralph Ditty secretary. Mr. Mills states that the company will continue the manufacture of Mills' No. 1 and No. 2 dry core compounds, and Ladelene compound for lining ladles and cupolas and of special foundry flours and core wash, as made by the Buckeye Milling Co. The new company will also serve as selling agent for the core oils of the C. E. Mills Oil Co. Plants are now operating in Cleveland and Syracuse, and the company expects to erect another at Milwaukee, in the near future.

PRICE CHART.





SIR HUGH BELL, BART.

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Supplement to
THE IRON TRADE REVIEW
August 8, 1907.

UofM

PERSONALS.

Henry C. Frick has returned from a vacation season spent in Europe.

George W. Armstrong has been elected a director of the Fort Worth Iron & Steel Co., Fort Worth, Tex.

E. L. Herndon has been appointed general manager of the Eastern Steel Co., Pottsville, Pa., succeeding A. H. Beale.

S. D. Hutchins has been placed in charge of the office of the Westinghouse Air Brake Co., which has been established at Columbus, O.

F. A. Morris has been appointed purchasing agent for the International Steam Pump Co., with headquarters at 114 Liberty Street, New York.

W. B. Dickson, second vice-president of the United States Steel Corporation, is spending the month of August on his farm in New Hampshire.

E. M. Sprague, contracting manager of the American Bridge Co., Cleveland, is spending a vacation at Muskegon, Mich., and other lake points.

George F. Gifford, who has been connected with the firm of Milliken Bros., Inc., in the capacity of contracting engineer, has been made chief engineer.

William B. Smythe, assistant sales agent of the Cambria Steel Co., Cleveland, has returned from an extended vacation spent at Atlantic City, Philadelphia and other eastern points.

E. B. Boye, until recently manager of the Cleveland office of Manning, Maxwell & Moore, has accepted a position with the Warner & Swasey Co., Cleveland, as its Chicago representative.

William D. Luscombe, formerly superintendent of the Oskaloosa Water Co., Oskaloosa, Ia., has been made superintendent of the water works plant of the United States Steel Corporation at Gary, Ind.

F. F. Prentiss, president of the Cleveland Twist Drill Co., Cleveland, and J. D. Cox, vice president of the same company, have returned from a European trip which was taken for both pleasure and business purposes.

William J. Watson has resigned his position of bridge engineer with the Osborne Engineering Co., consulting engineers, Cleveland, to go into the general contracting business. As yet, no one has been appointed to fill the vacancy caused by Mr. Watson's resignation.

Benjamin Talbot, formerly steel manager of the Pencoyd Iron Works, Pencoyd, Pa., of the American Bridge Co., has been appointed managing director of the Cargo Fleet Iron & Steel Co., one of the largest concerns of Great Britain, according to European advices.

Horace L. Chapman, of Columbus, O., it is announced, has been formally elected president of the Sunday Creek Coal Co. He was formerly an active figure in the Hanging Rock iron field, being interested in the Tropic Iron Co. and other neighboring furnaces.

John W. Gates and Charles G. Gates, his son, have sailed for a three months' stay abroad. Before sailing Mr. Gates gave out an interview in which he declared the present letting-up in business to be merely a readjustment of activities to the country's money supply.

Seward Babbitt, general sales manager of the Power & Mining Machinery Co., Milwaukee, has severed his connection with that company effective Aug. 1, and has been elected secretary and general manager of both the Lash Steel Process Co. and the Canadian Lash Steel Process Co. with offices in the White building, Buffalo.

V. L. Wills, general superintendent of the rolling mill division of the Tennessee-Republic companies, has been placed in charge of the Ensley steel mill division. Mr. Wills has been succeeded in his former position by William Wuthenow, of Pittsburg. J. H. LeFevre, assistant superintendent of the Ensley steel division, has also resigned.

Charles Brock, New York, has been elected president of the Susquehanna Iron Co., successor to the Susquehanna Iron & Steel Co. The other officers chosen are: Michael Blake, New York, treasurer, and Martin H. Clepper, Columbia, Pa., secretary. John Slater, superintendent of the Coatesville Tube Co., has been made superintendent of the Columbia pipe mill of the company.

Prof. Charles Henry Benjamin has been made dean of the college of engineering of Purdue University, succeeding W. F. M. Goss, who resigned to accept a similar appointment in the University of Illinois. Prof. Benjamin is a graduate of the University of Maine, and taught mechanical engineering in that institution and in the Case School of Applied Science, Cleveland, before being called to Purdue.

Joseph Wharton, the Philadelphia ironmaster, arrived in New York on Saturday and was met by Edward Kelly, H. C. Wenner, Benjamin Nicoll and a number of relatives. A special train conveyed him to his summer home at Jamestown, on Conanicut Island, where he is now recuperating. His health has so far recovered that he was able to be on deck a part of the homeward voyage.

Dr. David T. Day, chief of the division of mining and mineral resources of the United States Geological Survey, has been relieved of duty at his own request in order that he may devote himself to the preparation of the report on the petroleum resources of the United States for the government. Dr. Day has been connected with the mining and mineral resources division of the United States Geological Survey for 21 years, and he has made important contributions as a compiler of the mineral resources of the country. Edward W. Parker, who has been connected with the coal and coke department of the service, has been named Dr. Day's successor, with the title of statistician in charge.

OBITUARIES.

Samuel B. Stewart, formerly assistant purchasing agent of the Southern Steel Co., died suddenly July 20 near Birmingham, Ala.

Albert Francis Hall, aged 62, died at Somerville, Mass., July 22. For many years he was associated with the George F. Blake Mfg. Co., Cambridge, Mass., and the International Steam Pump Co., its successor. Mr. Hall was a member of a number of engineering societies.

Jasper N. Hill, one of the best known iron manufacturers in Indiana, died at his home in Anderson, Ind., July 29, from Bright's disease. He was born in Middletown, O., in 1834 and established the Hill Machine Co. in Anderson in 1889. From this beginning, has developed the Hill Machine Co., the Hill Tool Co. and the Hill Standard Mfg. Co.

Henry W. Clarke, founder and senior member of the firm of Hill, Clarke & Co., and father of Charles A. Clarke, died July 28 at his home in Waterbury. Conn., at the age of 85. Born in Princeton, Mass., in 1822, Mr. Clarke went to Boston at the age of 13 and secured employment with George H. Gray & Danforth, hardware merchants. In 1866 he became associated with Horace McMurtie & Co., engineers and machinery agents. This firm was succeeded a few years later by Hill, Clarke & Co., which devoted itself to the buying and selling of machinery, establishing itself as the pioneer machinery merchants of the country. Mr. Clarke retired in 1905 and was succeeded by his son, Charles A. Clarke, who is president of Hill, Clarke & Co., Inc., New York and Chicago.

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Devoted to Iron and Steel Manufacture and to the Machinery, Metal-Working and Foundry Trades

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August 8, 1907.

THE MIDSUMMER PIG IRON STATISTICS.

The midsummer pig iron statistics of the American Iron and Steel Association, reproduced in our issue of last week, showed a total production in the United States of 13,478,044 gross tons, at an annual rate of 27,000,000 tons. This would be a gain of 1,700,000 tons over 1906, but the gain over the first half of 1906 was 900,000 tons, or at the rate of 1,800,000 tons a year.

If the same amount of pig iron were produced in the second half as in the first half, the production in 1907 would be 26,956,000 gross tons. There were, however, 10 new furnaces blown in during the first half, these contributing but a portion of a half-year's output to the first half statistics. These furnaces can make about 420,000 tons more in the second half than they did in the first half, which would raise the year's total to 27,376,000 tons. Then there are other new furnaces coming in during the second half. The new Carrie No. 7, for instance, blew in August 2 and should make 70,000 tons by the end of the year. Other new furnaces are to come in, such as McKeesport No. 4 of the National Tube Co., due this month, one furnace at Lorain of the same interest, two Duquesne and two Youngstown of the Carnegie Steel Co. and a number of others. Should the entire furnace capacity of the country be utilized, the year's total could be brought up close to 28,000,000 tons, making a gain of a million tons from the first half to the second half. It is a question, however, whether the entire furnace capacity of the country will be needed, and a prediction of 27,000,000 tons of pig iron for the calendar year will probably come nearer the mark.

It will be recalled that the production of forge and foundry grades of pig iron showed a decrease in 1906 over 1905, although the total production of pig iron showed a gain of over 2,300,000 tons. This loss has not been repeated, the production of forge and foundry grades showing a larger increase than other grades, in the first half of this year. The full statistics of production by grades in the first half of this year have not yet been presented, but the production of Bessemer, basic, charcoal pig and ferro-manganese and spiegeleisen has been reported, and from these the production of all other grades can be arrived at by subtraction. In order to compare these figures with those for previous years we have compiled a table, in which one-half the production in 1905 and 1906 is compared with the reported production in the first half of this year. It will be observed that "all other" pig iron showed an increase of nearly 400,000 tons, in the first half of this year, over the average of last year, and of about 325,000 tons over the average of 1905.

PIG IRON PRODUCTION BY GRADES, FIRST HALF, 1907, COMPARED WITH AVERAGE PER HALF YEAR IN 1906 AND 1905.

	1905.	1906.	1907.
Bessemer ...	6,203,558	6,920,259	7,185,878
Basic	2,052,590	2,509,337	2,671,136
Charcoal	176,464	216,503	205,796
Spiegel and Ferro	144,991	150,250	172,675
All other ...	2,918,587	2,857,246	3,242,559
Totals 11,496,190		12,653,595	13,478,044

The actual consumption of foundry pig iron in the United States was increased in the first half of this year by the heavy imports. Pig iron imports in the six months amounted to 331,831 tons, or 244,342 tons more than were imported in the first half of 1905. It is safe to say that practically all of the increase was in foundry pig iron, or that the actual increase in the supply of foundry pig iron in the first half of 1907 over the first half of 1905 was about 550,000 tons. To maintain the proportion of forge and foundry grades to the total, an increase of about 500,000 tons from 1905 to the present was required so that the production of these grades has made up for the loss in 1906, and has shown a comfortable gain besides.

THE TRADE ASSOCIATION AND BUSINESS ABUSES.

Probably no recent industrial development has exerted a stronger purifying influence on general business conditions than the trade association. The organization idea, though in the iron trade alone it can be traced back a half century, did not meet with wide adoption until a comparatively few years ago, and most of the flourishing trade associations of today are still in the first decade of their existence. In this brief time, however, they have entered so completely into the complex ramifications of manufacturing and selling and, by virtue of broad membership, have come to be so thoroughly representative of their particular lines of activity that they wield a power which can scarcely be overestimated.

In the interests of the country's business morals, this is extremely fortunate, inasmuch as it affords a practicable means of reforming a wide range of loose commercial methods, which had a very natural origin in the disorganized state of affairs existing in ante-organization times and which spread and grew more loose as long as business interests had no convenient agency through which combined efforts could be directed at their uprooting. Nowadays, it is pleasant to note, they are disappearing as the interested associations can ferret them out and apply the co-operative cure.

Typical instances of the reform of long-existing abuses were furnished by the action of its Richmond, Va., convention, of a hardware association which numbers many steel and tool manufacturers among its members. The convention found that in the class it served heavy losses were suffered by reason of the indifference or carelessness of customers in deducting the cash discount from remittances after the stated discount period had lapsed. For an individual concern to battle against this costly abuse would have been both useless and self-destructive, but for an association with a membership from coast to coast the problem was simple of solution. This merely took the form of a resolution directing the membership to insist that the discount period be strictly observed, providing for reports on further violations of the rule and arranging for the general distribution of this action among the customers concerned, this brief resolution removing a source of annoyance which had been years in developing.

The same association put its stamp of disapproval on the so-called "catalog donation" and by insisting that its members hereafter decline to entertain any proposals of this sort put a speedy end to a practice which in occasional instances, at least, had become a species of business blackmail. Manufacturers have long complained that certain distributing concerns—to all intents and purposes classed as reputable—have been in the habit of compelling contributions for catalog purposes under threat of discontinuing the line of products. Often, it is reported, double and quadruple the actual cost of catalog space has been assessed against the manufacturer, the profits from this source being an important part of the distributor's income. Still more despicable is the method, frequently reported, of the dealer loaning the use of his business stationery to a printing concern, which in return agreed to publish his catalog without cost, defraying its expenses and netting a handsome profit out of the returns from extortionate advertising forced from the manufacturers represented in the products listed. Only by united action through the agency of the association can the long suffered abuse of this type be remedied, and the activity of trade organizations in this direction promises much for the betterment of industrial affairs.

MOLDERS' UNION

Changes Title of Organization—Apprentice Ratio Reduced—Injunctions Condemned.

The convention of molders, now in session in Philadelphia, last week took action upon several matters of general interest. It was decided to change the name of the organization from the Iron Molders' Union of North America to the International Molders' Union of North America, because the old title was considered too restrictive, inasmuch as the union includes in its membership molders in brass, steel and other metals.

The ratio of apprentices was changed by constitutional enactment from one in eight to one in five. There has long been friction over the old ratio, as it was contended that it was not liberal enough and failed to furnish a sufficient number of molders. The new ratio is aimed to correct this trouble.

Steps were taken for the organization of a life insurance company as an auxiliary of the union, which was definitely decided on at the Toronto convention five years ago. Since then the matter has been in charge of a committee, which has been studying insurance statistics collected from this country and Europe, with the assistance of a professional actuary. It has been decided to issue straight life policies in amounts of $500, $1,000 and $2,000, with regular monthly premiums.

Old Age Benefits.

Of even greater importance was the decision to lay the foundation for a superannuative benefit. The details of this have not been entirely worked out yet, and a study is being made of the workings of the system in Europe. A fund has been placed in the hands of a ways and means committee, and this will be added to from year to year until the time arrives to put the plan in operation. The size of the pension will be largely regulated by the length of membership in the union.

Government by injunction came in for some severe raps in resolutions presented by the committee on injunctions and unanimously adopted. These, after denouncing the action of some courts in issuing writs of injunctions against members of trades unions, had this to say:

On the specific injunction presented to us for our consideration, that was later made permanent by the Federal Court of Eastern Wisconsin, your committee, after having had the circumstances surrounding the case and the scope of the order laid before them, strongly urge this convention to instruct the incoming officers to prosecute the appeal from the court's order with all the power and vigor at their command.

Your committee would further recommend that the Iron Molders' Union, in convention assembled strongly urge its local unions and its entire membership to labor unceasingly and determinedly for the passage of such anti-injunction legislation as will prevent the issuing of injunctions or other court decrees which in any way deny or interfere with our constitutional right of free speech, peaceful inducement and lawful association.

Milwaukee was chosen as the next convention city.

INDEPENDENT CAR OWNERS FORM ASSOCIATION.

A temporary organization of independent freight car owners of the country was effected at a preliminary meeting at the Hollenden hotel, Cleveland, Aug. 2. Arrangements were also made for another meeting at the Auditorium Annex in Chicago, Sept. 3, when a permanent association, to be known as the Individual Freight Car Owners of the United States, will be formed. The purpose of the organization as outlined in the resolutions adopted by the meeting is "to bring about a uniform, lawful and equitable system for the handling and use of individual cars throughout the United States and to provide for a just and legal compensation to be paid for the use of individual cars by others than the owners." A committee of five was appointed to draft a permanent constitution, rules and by-laws which will be presented at the Chicago session. This committee consists of C. McIlvane, Pittsburg; C. O. Johnson, Pittsburg, F. J. Reichmann, Chicago; Max Eppstein, Chicago, and C. D. Chamberlin, Cleveland. W. L. Andrews, of Baltimore, temporary chairman, and Robert J. Bailey, of Pittsburg, temporary secretary, will serve on this committee as ex-officio members.

LATE RAIL SALES.

New York, Aug. 7.—Rail sales announced by the leading interest include the following for 1907 delivery: Northwestern Pacific railway, 5,000 tons; Elliott Frog & Switch Co., 2,100; Great Southern Lumber Co., 2,000; scattering 1,000; for next year's delivery, Idaho and Northern railway, 6,000; Morden Frog Crossing Co., 6,000; Central Illinois Construction Co., 3,500; miscellaneous, 1,000.

Heavy pig iron buying by pump and pipe interests at lower prices is reported. British opening on No. 3 Middlesbrough 57s 7d.

RAPIDLY RESUMING.

DOCKS AT HEAD OF LAKES IN FULL OPERATION

And Large Majority of Miners Are Working.—Open Shop Principle Will be Rigidly Adhered to.

Office of THE IRON TRADE REVIEW,
411 Providence Bldg.,
Duluth, August 6.

The strike on the three docks at the head of the lakes has been ended. Work ceased at Duluth, July 12, at Two Harbors, July 14, and at Allouez, July 15, resuming at all three docks on Thursday morning last Aug. 1. On Wednesday morning, President Olcott, of the Duluth, Mesabi & Northern railroad submitted the following communication to a meeting of the strikers:

President Olcott's Letter.

Hon. M. B. Cullum, mayor, city of Duluth—Dear Sir: We are in receipt of the communication addressed to you, under date of the 29th inst., from a committee of ore dock employes of this company, and beg to say that said communication has had our most careful consideration.

It is our desire to resume work at the docks at once, and we shall be greatly pleased if the employes, after careful consideration, shall finally decide to go back. If they do, we assure you that there will be no discrimination against any of them, and that no additional men will be employed until all of our old employes are given an opportunity to return to work, if they so desire.

We desire to commend the dock employes for the peaceable and law abiding manner in which they have conducted themselves during the past two weeks, and beg to assure you that, if, and when the strike is ended, it shall be our purpose to give the men through committees representing all our employes, every opportunity of taking up, from time to time, with the officials of the company, matters of mutual interest or concern and to treat with them in all matters with the same degree of fairness that we have always accorded.

We believe that the dock employes will find it for their own best interests to resume work without delay. If, however, they decide otherwise, kindly say to them that we shall feel at liberty to employ other men permanently to take their places at once, much as we regret the necessity for so doing.

So far as we know, only two matters of difference exist:

1. The question of open shop.
2. The rate of wages.

You and the men well know our position on this first question. For 14 years past we have consistently stood upon the broad policy that we have the inherent right to employ any man seeking to enter our service irrespective of whether he is affiliated or not with any organization or association and without regard to nationality. We believe our position here is unassailable and, in fact, as you will recall, the committee of our dock employes, in their communication to you dated the 27th inst., expressly disclaimed that they were making any demand upon us for the "closed shop" policy.

In regard to the rate of wages, permit us to say that the present scale to be effective until Oct. 31, 1907, was the result of a verbal agreement between all the dock employes, represented by their own committee and the company. This agreement was made at a conference at which eight men representing the employes were present, and was thoroughly understood and assented to by both parties at that time and work at the docks was carried on for two months under the same. In our relations with our employes, as well as with the public, we consider a verbal agreement as binding and effective as a written one.

We think that the dock men should show their good faith and intention to carry out their agreement made in May by immediately returning to work.

Whatever the conclusion of these negotiations may be, we desire to express to you our sincere thanks for your untiring, impartial and public-spirited efforts in attempting to adjust the difficulty and bring about a peacable and much to be desired solution of the matter and assuring you of our personal regard, believe us, very respectfullly yours,

W. J. OLCOTT, President.

After a debate lasting two hours, the striking men decided to return to work, having been assured that no discrimination was to be made by the company and work was to be resumed exactly as it had been left.

On Thursday morning, at Duluth, about 240 men came to work, obtained their old check numbers, seemed glad to get back and have been working ever since. On the night shift Thursday, 292 men reported and on Friday morning the day shift increased to 258, some new men being hired, so that there are now at work 550 men as compared with 750 before the strike. All of the 750 were not necessary, however, simply being kept by the company, so that the dock is now in shape to hande its full quota of ore, 100,000 tons daily. In the 24 hours beginning Thursday morning, 1,710 cars were unloaded as compared with the usual number, about 2,200. The ore which has been standing in the cars subject to sun and rain has baked pretty hard on top and makes the handling on the dock a little more difficult. On Thursday, both day and night shift, the full schedule of ore was shipped from the Hull-Rust pit, 200 cars being loaded, but this was practically all that was sent down from the Hibbing district.

The conditions on the other docks are almost identical with those at Duluth. The crews are somewhat shorthanded at present because of the migration of the old men, but other men are available. There will be no further hindrance to shipping because of the docks. An effort is being made to load those boats which have been waiting longest as quickly as possible, but the right cargoes are not always available from that ore which has been standing on the tracks and boats are still forced to wait for mine shipments.

Situation at the Mines.

With shipping again made possible through the resumption of operations at the docks, a more determined effort is being made to mine ore. The number of miners returning to work is increasing daily. While no accurate figures are obtainable, probably very close to 75 per cent of the miners are now working, 10 per cent have left the range and the remainder include those who are afraid to work and the ones who are causing the trouble. Rumors of violence and exciting encounters are numerous, but there seem to have been no instances where the strikers have failed to comply with the orders of the deputy sheriffs.

Parades have been stopped by the sheriffs and meetings of the strikers where speeches considered threatening were being made have been broken up. The strikers have resented what they term this unjustifiable limitation of their rights and without question they have been handled with little gentleness, so that a good many hot words and some threats have been passed. Armed outbreaks by the strikers are frequently spoken of, but evidences are almost altogether lacking even in the most turbulent centers. Many weapons are undoubtedly being carried and with the uncertain tempers of these classes are always dangerous things, but any general resorting to armed enforcement of their demands by the idle men seems entirely improbable.

The precautions taken by the sheriffs have been very prompt almost to the anticipating of every move of the strikers and though unusually severe and stringent and practically to the limit of their rights, have been endorsed officially and popularly throughout the state.

Men not United.

This strike has an unusual degree of disagreeable uncertainty about it. If the men were a unit in their dissatisfaction, it would be a case of settling with all or none, and the mines would operate or would not. As it is, with the large majority willing to work, and with no possibility of any accession to the demands of the trouble making minority, there will continue to be this element of malcontents who, even if they do return to work, will maintain a situation of which the present outbreak is but the virulent form. There seems to be a great deal of justice in the opinion that Teofillo Petriello, the man who has been practically the sole leader and inspiration of the strike, might have done much more for his countrymen were his motives truly unselfish, than by arousing in a previously satisfied and prosperous community a feeling of discontent and antagonism

that at best will require a long time to eradicate.

During the week, President Cole and General Manager Mitchell, of the Oliver Iron Mining Co. spent a couple of days personally looking over the situation. It is significant that, immediately following, a night shift was started at the Hull-Rust, which action may be taken as indicative of a returning confidence in the security of operating. There is no longer a single locality entirely shut down as was the case a week ago and the return to normal conditions will probably continue slowly, for many of the strikers under the influence of their leaders show considerable stubbornness.

The shipments for the month of July this year are probably one-half what they would have been from the three docks though 2,621,956 tons were handled. Of this the Mesabi dock moved 1,057,319 tons, as compared with 1,801,096 tons last year, Two Harbors 801,844 tons, against 1,274,415 tons in 1906 and Allouez 762,749 tons, against 917,761 tons a year ago. This shows a total loss due to the strike compared with last year of 1,371,316, which still leaves the docks with a net gain in 1907 over 1906 of 160,204 tons.

FOREIGN IRON IMPORTS

Doubled in Past Fiscal Year—Other Iron and Steel Imports and Exports.

In the government figures complied by the department of commerce and labor on the iron and steel imports and exports for the fiscal year ending June, 1907, the percentage of increase in pig iron imports stands forth clearly from the changes in figures over preceding years shown by the principal iron and steel products. The receipts of foreign iron by this country have more than doubled in the past year up to July, 1907, and have more than quadrupled over 1905. The month of June, 1907, showed total imports of 44,885 tons dutiable, against 66,276 tons dutiable in May, 1907, and 22,906 tons dutiable in June 1906. The figures for the complete fiscal year ending June, 1907, on pig iron imports are as follows:

Year.	Tonnage.	Value.
1907.....	564,846	$15,654,767
1906.....	271,790	7,778,884
1905.....	122,977	2,989,069

Iron Ore Imports.—A comparatively small gain has been made in the imports of iron ore in the past fiscal year, and a less percentage of increase is shown by the year to June, 1907, over the previous year than by the period up to June, 1906, over its predecessor. The imports of June, 1907, were 70,508 tons dutiable, against 136,266 tons dutiable in May, 1907, and 92,557 tons dutiable in June, 1906. Totals for the complete fiscal year are as follows:

Year.	Tonnage.	Value.
1907.....	1,096,717	$3,360,449
1906.....	981,026	2,728,854
1905.....	757,323	1,670,683

Crude Steel Imports.—A decrease in total tonnage received from foreign mills is shown by crude steel imports in the fiscal year up to June, 1907. An interesting fact reflecting upon the higher price of steel products is apparent in the total valuation figures which with a less tonnage in 1907 showed a larger sum than the preceding year with its increased amount of total imports. The figures for June, 1907, show imports of 903 gross tons, against 1,506 gross tons in May, 1907, and 2,275 gross tons in June, 1906. The totals for the fiscal year are as follows:

Year.	Tonnage.	Value.
1907.....	18,519	$3,033,928
1906.....	19,643	2,672,668
1905.....	9,802	1,641,549

Steel Rail Exports.—The past fiscal year has developed a decided falling off in the shipments of American steel rails for foreign lines, and this decrease is in conformity with the conditions that have prevailed for the past several years. The total shipments for June, 1907, were 18,358 tons, against 11,726 tons in May, 1907, and 25,996 tons in June, 1906. The aggregate exports for the past fiscal year are as follows:

Year.	Tonnage.	Value.
1907.....	291,322	$ 8,384,241
1906.....	345,826	8,904,642
1905.....	409,429	10,288,346

Sheet and Plate Exports.—Iron sheet and plate exports have almost tripled in the past year, and are maintaining the high percentage of increase shown in the past several years. The exports for June, 1907, were 2,462 gross tons, against 2,925 gross tons in May, 1907, and 1,369 gross tons in June, 1906. The fiscal year totals are as follows:

Year.	Tonnage.	Value.
1907.....	29,620	$2,060,427
1906.....	10,233	621,131
1905.....	5,556	316,449

Steel sheets and plates, also show a substantial gain over the preceding fiscal year. The exports in June, 1907, were 7,517 gross tons, against 8,954 gross tons in May, 1907, and 6,590 gross tons in June, 1906. The aggregate figures for the fiscal year are as follows:

Year.	Tonnage.	Value.
1907.....	98,176	$4,519,776
1906.....	78,562	3,495,551
1905.....	70,989	2,788,571

The Illinois Steel Co. blew out two furnaces during July; No. 2, at the South works, being blown out July 10, and No. 2, at the Joliet works, being blown out on July 15.

HAPPY EMPLOYES

Entertained at the Cincinnati Metal Trades Association Outing.

The outing given by the members of the Cincinnati Metal Trades Association to the employes in their shops and their families was remarkable in some of its features. The employes and their families from 70 shops in and around Cincinnati participated in this outing. In all of the immense gathering of more than 36,000 men, women and children, in a large summer resort, there was not one case of drunkenness, boisterousness, rowdyism or disorder. This was not due to rigid police regulation, but to the voluntary and natural good behavior of the crowd. There was not an accident.

As one moved about the park, through that vast throng of merry-makers, and they were merry and happy, the well dressed, well kept, and generally prosperous and contented air to be noted everywhere was a striking testimonial to the apparent high grade of the employe in the Cincinnati shops.

Many of the men wore badges bearing the name of the firm or company that employed them, and seemed to be proud of wearing such badge. The spirit of shop pride was as much in evidence by the employer as by the men. The employers were on the ground to cheer the winners in the contests and were introduced to the families of many of their employes.

At the banquet of the employers in the evening, many of the young men in the offices of the manufacturers participated, and broke bread with their chiefs. It was American throughout. There was respect for the man who had made a success of life, and there was respect for honest labor as an integral part of that success, with appreciation of good service and all the evidences of ample reward for faithful performance.

The recollection of the day will be carried back into the homes by the wives and children, not because it was a free outing, but because it was a day when the bond of friendship and manly appreciation of the relations between employer and employe were brought to the surface and came into recognition, a condition which cannot be brought about in the busy shop routine of daily toil. It was a study, a lesson in political economy, and reflects credit on those who conceived the idea and carried it into execution.

INDIVIDUAL FURNACE OUTPUT LESS IN JULY.

July as a pig iron producer, while turning out a larger aggregate tonnage in its 31 days, did not equal the record attained by June, a 30-day month, in respect to individual furnace capacity.

July's total of 2,257,993 tons, as compared with the June total of 2,237,420 tons, netted a gain of 20,573 tons. Against May, a month of equal length, which established the high producing record of the present year with 2,291,030 tons, July shows a falling off of 33,037 tons.

The average daily capacity of the furnaces in blast in June reached 74,581 tons, while July's corresponding figure was 72,823 tons, or a considerably less tonnage. This appears to have been due in a great measure to the number of stacks which were blown out in the month for repairs, or were interrupted in their operations through other causes. The idle capacity was somewhat larger than in the preceding month, as on August 1 there were but 335 stacks in action, against 341 stacks on July 1.

The average daily capacity in blast on the last day of July was 72,788 tons, against an average daily capacity of 75,258 tons on the last day of June. As a forerunner of August output, this fact indicates a decreased total in that period.

Of the total of 2,257,993 tons of pig iron produced in July, 1,485,909 tons were utilized in the mills of the producers, while 746,643 tons were made for disposal in the open market.

JULY FURNACE REPORT.

STATE	NO. OF STACKS	NO. IN BLAST ON LAST DAY OF MONTH.		PERCENTAGE OF TOTAL POSSIBLE OUTPUT MADE.	AV. DAILY CAPACITY IN BLAST LAST DAY OF MONTH.	ACTUAL TONNAGE MADE.		TOTALS	
		JULY	JUNE			MERCHANT	NON-MERCHANT	JULY	JUNE
Pennsylvania	154	136	141	89.4	32,261	241,420	755,480	996,900	998,667
Ohio	60	58	58	94.8	15,412	144,805	319,052	463,857	457,080
Alabama	46	30	31	67.5	4,372	121,263	15,919	137,182	132,222
Virginia	23	18	17	74.5	1,451	42,834	———	42,834	42,640
New York	24	19	17	76.7	5,175	64,307	91,196	155,503	141,043
New Jersey	11	8	9	73.0	1,122	34,788	———	34,788	32,460
Illinois	24	22	24	92.0	6,967	23,820	189,562	213,382	219,043
Tennessee	18	14	14						
West Virginia	4	4	4	61.5	2,162	41,392	27,717	69,109	71,349
Kentucky	8	4	5						
Maryland	4	4	4						
Wisconsin	6	6	5	99.6	3,229	13,825	85,633	99,458	91,603
Colorado	6	6	6						
Georgia	2	2	1						
Texas	2	1	1						
Minnesota	1	1	1	74.2	637	18,189	1,350	19,539	21,780
Michigan	2	1	2						
Missouri	1	1	1						
Spiegel—All states								18,790	19,736
Ferro—All states								6,651	9,717
Totals	396	335	341	———	72,788	746,643	1,485,909	2,257,993	2,237,420

BLAST FURNACE NOTES.

The Rising Fawn furnace, of the Southern Steel Co., at Rising Fawn, Ga., was blown in July 10.

The name of the Woodstock Iron Works, Anniston, Ala., has been changed to the Woodstock Iron & Steel Corporation.

The Upson Nut Co., Cleveland, has taken over and is operating the River furnace, Cleveland, formerly operated under lease by Corrigan, McKinney & Co.

No. 1 furnace, of the Buffalo & Susquehanna Iron Co., was blown in on July 1.

Northern furnace, of the Northern Iron Co., Port Henry, N. Y., was blown in on July 19.

The Sarah furnace, of the Kelly Nail & Iron Co., was out of blast 22 days during July.

Bellefonte furnace, of the Bellefonte Furnace Co., Bellefonte, Pa., was blown out for relining on July 23. The company expects to resume about Aug. 25.

Allegheny furnace, of the Allegheny Ore & Iron Co., was out of blast the entire month of July for relining.

Pulaski furnace, of the Pulaski Iron Co., was blown out on July 21 for relining.

Radford Crane furnace, of the Virginia Iron, Coal & Coke Co., was blown in on July 20.

Furnace A, of the Northwestern Iron Co., Milwaukee, was blown in on July 14.

Will Erect Furnace.—Charles H. Schaffer, president of the Boyne City Charcoal Iron Co., Marquette, Mich., has associated with himself several other capitalists in the project for the erection of a charcoal iron furnace and chemical plant at East Jordan, Mich. The new furnace will produce from 70 to 90 tons daily, and the chemical plant will consist of 16 retorts with a capacity of 140 cords of wood daily. Those interested in the enterprise besides Mr. Schaffer are: F. B. Baird, of Buffalo, vice-president of the Boyne City Charcoal Iron Co., W. S. Shaw, W. H. Mathews, Fred Smith, manager of the Boyne City Charcoal Iron Co., of Boyne City, and W. J. Ellson, of Onota, Mich. Mr. Smith will have complete charge of the construction.

Freighters Ordered.—Capt. W. C. Richardson, of Cleveland, has given an order to the American Ship Building Co. for a freighter for 1908 delivery. Except for the fact that she will have 2 feet more beam the steamer will be a duplicate of the David Z. Norton, which Capt. Richardson regards as one of the best bulk freighters on the lakes. The new steamer will be 500 feet over all, 480 feet keel, 54 feet beam and 30 feet deep, and will have triple-expansion engines and Scotch boilers. Her hatches will be 12 feet fore and aft and spaced 24 feet centers. It is expected that her extra beam will enable her to carry about 500 tons more than the Norton, or in other words, about 9,000 tons. W. H. Becker, of Cleveland, has also closed a contract with the American Ship Building Co. for a new freighter for 1908 delivery to be 524 feet over all, 504 feet keel, 55 feet beam and 30 feet deep. It will be noted that her beam is one foot in excess of the ordinary beam of vessels of these dimensions. The steamer is promised for next April. A third order placed with the American company is for a freighter of 9,000 tons, for Harvey L. Brown of Buffalo.

The Northern Pacific railroad is erecting a large new machine shop 125 x 450 feet to its shops at Tacoma.

EMINENT MEN OF THE IRON WORLD

IV. SIR HUGH BELL.

BY J. HORTON

The group of famous British ironmasters, who are to be introduced to readers of THE IRON TRADE REVIEW in this and coming issues must, necessarily be headed by Sir Hugh Bell,

ROUNTON GRANGE, SIR HUGH BELL'S RESIDENCE.

Bart, the able, popular and genial president of the Iron and Steel Institute. This distinguished trade body recognizes no national barriers, and Sir Hugh is of just the cosmopolitan type to command respect and affection equally among Americans and Britishers. But, to the interest of personality is added just now the more matter-of-fact interest of commerce, for Middlesbrough is a kind of world's Emporium of pig-iron, whose customers are coming from all parts of the earth, and Sir Hugh Bell has been one of the great builders, not only of the iron and metal trade of Middlesbrough but of the go-ahead town itself.

It is a remarkable coincidence that the firm of Bell Brothers was founded in the year 1844 by Sir Lowthian Bell, the father of Sir Hugh, himself a chemist, inventor and scientific discoverer, of world-wide fame. That was the year in which Sir Hugh was born, so that the president of the Institute and the great iron trade of Cleveland, which Sir Lowthian thus initiated, may be said to have taken their growth together. But probably nobody foresaw the huge dimensions to which the trade would attain, for at present there are 86 furnaces in full blast in Cleveland, with an output of pig iron for last year of 3,600,000 tons, and a daily shipment from the Tees of something like 5,000 tons of pig-iron, quite apart from the large quantities of pig and manufactured iron and steel forwarded by rail.

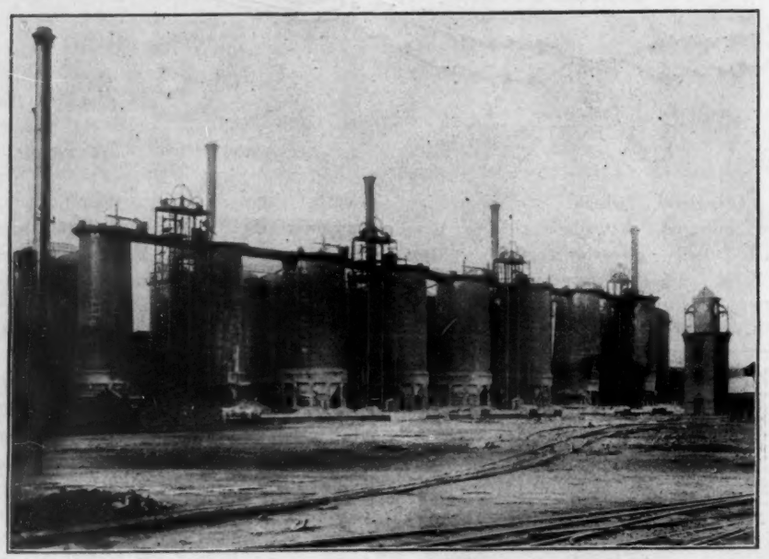
Sir Hugh's Family.

Sir Hugh has witnessed, and taken no small part in the growth of the great iron and steel district. His family has been connected with the iron trade for just a century, for it was in 1807 that his grandfather, Thomas Bell, entered the firm of Losh, Wilson & Bell, and at his death the elder sons, in the year 1845, succeeded to his interest in the iron-works at Walker-on-Tyne. The firm was already bringing, from the Yorkshire coast, ironstone to smelt in a furnace built by Sir Lowthian Bell, when news arrived of the discovery of the Cleveland ironstone. The great significance of that discovery was to some extent realized, and a number of furnaces were soon in course of erection, including three by the firm of Bell Bros. and in 1854 these furnaces were blown in. Since that time

A SCENE AT ROUNTON GRANGE.

the history of the firm, as well as that of the district, has been one of continued progress. The story scarcely needs retelling now. Mining

areas were extended, colliery lands acquired, more and more furnaces built and eventually modernized, railways developed, and output greatly increased. The most important step of all was the demonstration so recently as 1897 that steel could be made from Cleveland iron. It was this which led to iron manufacture being given up at Dorman-Long's works, and the firm being turned into a limited company for extensive and exclusive steel manufacture.



Old Side Furnaces, Clarence Works, Bell Bros.

In the early days of the firm, it was satisfied to produce 150 tons a week from a furnace; now, 100 tons a day is looked upon as the quantity below which a furnace ought not to fall, and as much as 913 tons a week has been obtained from one of the furnaces at Messrs. Bell's Clarence Works. At this establishment alone there are twelve entirely modern furnaces, 80 feet high by 16 feet in diameter. The American plan of blowing each furnace independently has been generally adopted throughout the plant.

Steel Works Development.

Side by side with the production of raw material, has been the development of steel works, and the two establishments in which Sir Hugh is mainly interested, namely Messrs Dorman, Long & Co., Ltd. and Bell Bros., Ltd., have the very latest equipment in the way of rolling mills, open hearth furnaces and electrical apparatus, for the production of rails, girders, ship-plates and material, and constructional metal generally. The Dorman-Long firm, of which Sir Hugh is principal owner, has 11 open-hearth furnaces and is generally on a large scale. Both firms are enormously prosperous and Sir Hugh's attitude with regard to the necessity for alertness is well expressed in the following passage from his recent presidential address at the spring meeting of the Iron and Steel Institute:—

"If we in this Kingdom are to keep our place in the world of industry we must be ready to make use of the changed methods, as our grandfathers were ready in their day to avail themselves of the forces newly placed at their disposal. For we, as they, look out on a world of perpetual change."

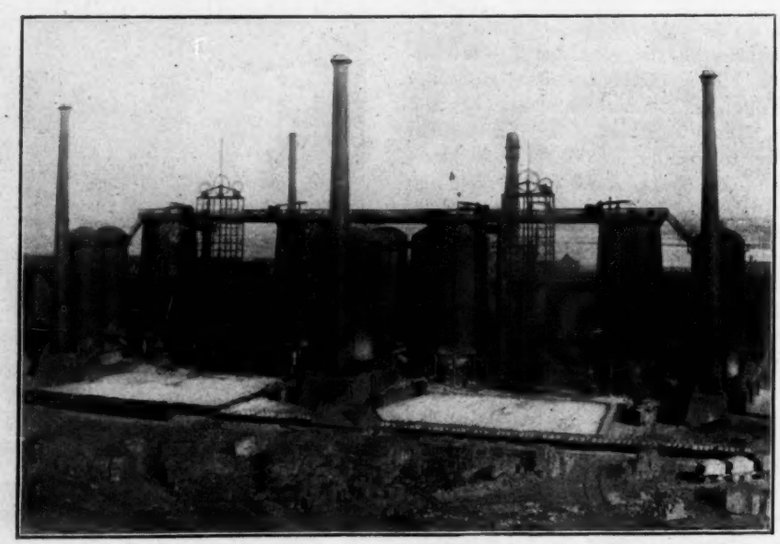
In the same address Sir Hugh said with characteristic modesty:—

"I am only too sensible that it is because of my parentage that the choice of the Council has fallen on me, and that it is as the son of Sir Lowthian Bell that I have been selected to follow a most distinguished series of men, who have adorned the chair I now unworthily fill."

Sir Hugh hardly did himself justice in this modest expression. Undoubtedly from the time Sir Lowthian Bell published his book in 1872 on "The Chemical Phenomena of Iron Smelting" until his death in 1904, the services rendered by that gifted metallurgist were incalculable, and it is only natural that the Institute should keep a niche of special honor for the memory of the man who presided in 1869 over the first meeting of the Iron and Steel Institute. But Sir Hugh has claims of his own of remarkably varied character. It is true that although, like his father, an able chemist, he has not devoted himself to chemical research. Nor did he, although an original member of the Institute and a constant attendant at the meetings, take any prominent part in the Institute's work until his father's death. But it is also true that his share in the development of the iron and steel trade has been very important.

Labor Saving Devices.

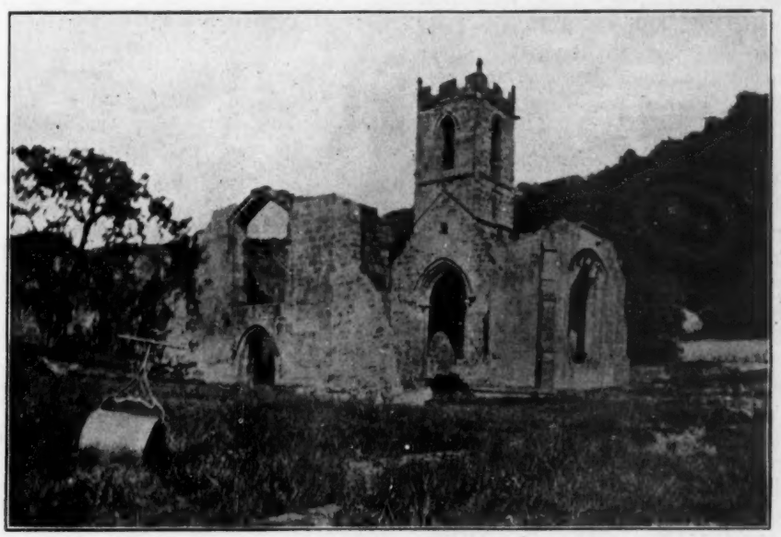
Probably no keener and shrewder economist can be found in the trade, and nobody has been more eager to adopt labor-saving appliances, and utilize every available device for cheapening production, and in this department he has achieved great



New Side Furnaces, Clarence Works, Bell Bros.

success and enormously added to the prosperity of the works. The president "owned up" on this subject with refreshing candor at the Institute dinner, when, replying to a remark by Monsieur Yves Guyot that "it was no use trying to save on bootlaces." Sir Hugh said he spent an enormous number of hours in trying to save, not merely on bootlaces, but on tags.

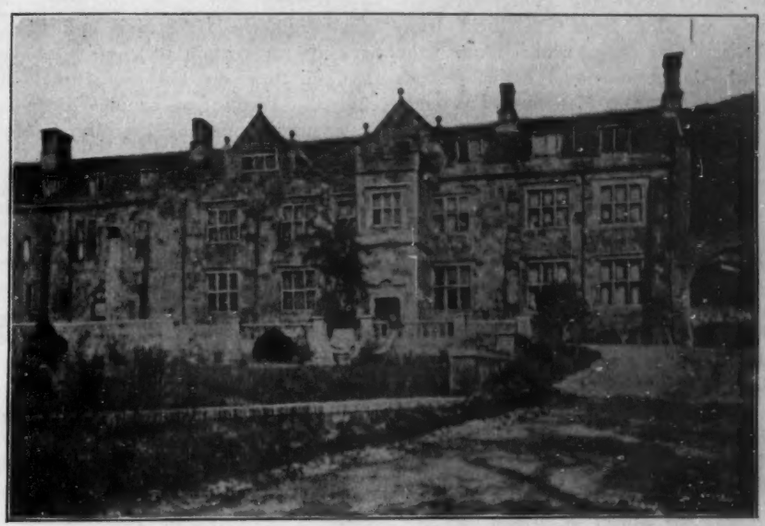
Summarizing Sir Hugh's career and the positions he holds, it may be said that he was educated at Merchiston Castle, Edinburgh; at Paris, where he went at the age of 16, and subsequently at Gottingen, returning to England in 1862 at the age of 18. His first marriage took place in 1867, but his present wife, Lady Bell, is the daughter of Sir Joseph Olliffe, M. D. Sir Hugh has been since 1896, Lord Lieutenant of the North Riding, of Yorkshire, and he is also J. P. for the North Riding, as well as for Middlesbrough; he is D. L. of Durham; was made sheriff in 1895; and is also an alderman of Middlesbrough Town Council with which he has been connected since 1869. He is managing-director of Messrs. Bell Bros., director of Dorman, Long & Co., and of Brunner, Mond & Co., and of the North Eastern Railway. He was appointed a member of the Tees Conservancy Commissioners in 1875, and for a long time past has been chairman of that very important body. Apparently, the only honor he has not achieved is election to the House of Commons. He contested Middlesbrough as a Unionist in 1892, but was unsuccessful, and never made a second attempt. Outside of Parliament he has done an immense amount of political work, and it will be remembered that at the meeting of the Institute, numerous compliments were paid him in respect of his literary gifts. He is a most accomplished writer on economics and has made numerous contributions to the reports of royal commissions and the like. As a most ardent free trader he has written many articles in the reviews in support of the free trade policy.



MOUNT GRACE PRIORY.

Lady Bell's Books.

In the literary sphere, his wife, Lady Bell, is even more famous. She is one of the few Englishwomen able to write as well in French as in English, and she has produced quite a number of essays and plays, which have achieved fame, including: "The Story of Ursula", "Chamber Comedies", and a number of fairy tales. One of her plays entitled "L'Indecin" was produced by Coquelin at the Royalty Theatre in 1887. Her latest production entitled "At the Works: A Study of a Manufacturing Town" was only recently published and has attracted a great amount of attention. Her ladyship has aimed in this work at producing a life-like picture of the family life of the men employed at the works associated with the name of the Bell family. The picture is vivid, but on the whole saddening, especially in its exhibition of the thriftless, worthless, incompetent crowd of men, who fling their money about in the public house and on the race course, and of the wives who know how neither to manage their own households nor to cook. It should be added that the writer and her friends have endeavored not only to realize the problem, but to grapple with it both from the philanthropic and the educational point of view.



THE MANOR HOUSE AND ENTRANCE TO MOUNT GRACE PRIORY.

A Great Undertaking.

A word should be added with regard to the work in connection with the Tees improvement which has had a great deal to do with the growth of Middlesbrough. The accessibility of the coal and ore would not have sufficed to secure prosperity if the waterway had not been greatly improved. Forty years ago, it was merely a river of possibilities, the depth of water at the bar being only 3½ feet at low tide. It is now 20 feet with 37 feet at high water. This has been effected by training walls,

by dredging and by the construction of breakwaters. There are no less than 24 miles of training walls, carried up to about five feet above low water level and constructed entirely of slag from the local ironworks. One breakwater alone, the South Gare, consumed 5,000,000 tons of slag and 18,000,000 tons of cement, and the work occupied 24 years in building. The general effect of the operations is that at Port Clarence, the headquarters of Bell Bros. vessels drawing from 15 to 24 feet may lie afloat at low water. The main channel has been made from four tortuous, varying, and uncertain streams into one safe waterway, navigable at all states of the tide, while no less than 2,800 acres have been reclaimed from the foreshore. A great deal of this work has been done not merely with the co-operation but on the initiative of Sir Hugh Bell.

Sir Hugh at Home.

The president of the Institute was good enough to afford the British representative of THE IRON TRADE REVIEW a special interview at his London house in Sloane street with the object of coming somewhat more closely into touch with American readers than would be otherwise possible. It may be said in a sentence that the interview was a delightful and memorable experience. Sir Hugh is one of the most charming personalities in the British iron trade as well as one of the finest specimens of the cultured English gentlemen. In spite of his 63 years, he is as straight as an arrow and as keen, vivid and alert as many men 30 years his junior. The gray hair is the only token of advancing age, and it is difficult to realize that Sir Hugh is rapidly getting towards the psalmist's limit. At times, his conversation is brilliant, while the literary flavor, bespeaking equally natural talent and thorough culture is always evident.

The interview took place in the small and simply furnished office at the rear of the premises where the completeness of the arrangements testified to the up-to-date man of business. Sir Hugh was modest as to his achievements, but he did not deny the soft impeachment that he had had a large share in the upbuilding of his great concern. He had taken charge of the business management rather from the economic than the technical side of the work, adding: "It is the economic side that interests me most deeply." Talking of his early reminiscences, a most interesting recollection was cited. He was traveling in the early part of 1869 in the East of France, where a pit was being sunk and as the visitors were walking over the ground, the Frenchman who was conducting the party remarked: "Prussia and France are almost certain to come to blows, and if they do, this is where they fight." Within a couple of years, this prediction was literally fulfilled.

Growth of Middlesbrough.

Sir Hugh referred with some pride to the growth of Middlesbrough. "The town has never looked back after the discovery of the ironstone. The site of the iron town was clearly and mentally indicated, but the real struggle came in 1856, which was a time of great anxiety. As a matter of fact, the worst time we ever went through was not when pig-iron was 28 shillings but when it was 64 shillings, coming down from 120 shillings. It was impossible to cover the costs."

With regard to the works on the Tees, Sir Hugh thinks the canalization of that river, one of the most remarkable things ever done in that line while the reclamation of land has been of great value. With regard to his solitary political contest, Sir Hugh made the odd remark: "I stood for Middlesbrough in the three-cornered contest in the full hope that I should not be returned, and I was not and I have never tried again. I have always been a strong Unionist and an anti-Home Ruler. Practically Home Rule took one out of politics and I have acted with the Tories all these fifteen years, and I would again on that subject, but I won't vote Protection."

Coal and Iron Supplies.

The interview next directed the conversation towards the question of coal and iron supplies, which according to some alarmists may at no very distant date reach extinction. On this point, Sir Hugh was very emphatic: "In England," said he, "No-one need look forward more than ten years, thirty years is eternity. In politics a century is eternity, but England is perfectly certain of a 200 years' coal supply; more likely it will be 400 years, and in all human probability 800. You and I need not worry. If you have got children, neither their children, nor their children's children, need be afraid. With regard to the world's supply there are hundreds of millions of tons of coal and iron ore in South Africa, but they can't be developed either there or in Australia without enormous increases in population. You can't have an iron trade in a sparsely-peopled country."

As to the relation between the two countries, Sir Hugh expressed his satisfaction that the rivalry had been friendly and mutually respectful. He had friends in America for whom he felt the highest regard, although, he did not always agree with American ways of looking at business, and some American ideas could not possibly be transplanted, though they might be translated. Certain labor saving apparatus could not be profitably introduced into his country, and things done by machinery in America could in some cases be more cheaply done by hand labor in Great Britain. Sir Hugh expressed his great satisfaction that for so long a time, the relations of his great establishments with their workmen had been so entirely amicable. He was a member of the Conciliation Board in the Coal Trade, president of the Cleveland Mine-owners' Association and connected also with the Cleveland Ironmasters' Association. The relations of capital and labor in that district were quite reasonable and friendly. He had not the slightest objection to the union. "When the union shows it represents our men, of course we will deal with it. What I want to do is to get close enough to my men as to let them see my mind, and let me see theirs."

Business not Charity.

Sir Hugh hastened to add that business is not a charitable institution. It is carried on for the simple and sole object of making money. "I keep my business and my benevolence in different pockets, and I look at my business solely from the business point of view."

One of the most outspoken expressions was on the subject of tariffs. He said: "I am a free importer of the most desperate character. The best thing for the world would be absolute free trade everywhere, but the next best thing is as many commercial free traders as we can have. The one most important thing for the whole race is that there should be one great industrial free trade kingdom. The only thing I dread is our being left in the condition of being under the dominion of accumulated wealth, and that great danger I fear is increasing.

"My free trade formula would be that a nation only buys the thing it

wants, and if by any accident you get coals to Newcastle, the quantity is not large. People seem afraid of getting things we don't want. The Board of Trade returns show that England buys only two things very largely, and they are raw material and food, and food is our most important raw material. It is very significant that our chief customer is the Argentine Republic, and the obvious reason is that nobody can supply the Argentine Republic so well with the goods she wants, and nobody is so willing to take in return the stuff that she wants to sell."

An Ardent Free Trader.

Sir Hugh concluded that having carefully studied the economics of free trade, his own difficulty was to see how anybody could possibly hold other than the free trade view.

The conversation turned to the question of the prospects of the trade when the boom begins to subside, and on this point Sir Hugh is confident that for the next 15 or 20 years the world will be much more likely to experience a scarcity than a surfeit of iron. "Trade will be good for the next half generation, and the productive power of the world won't catch up with the world's demand for the next 20 years. The principal reason is that we have been able to produce iron very cheaply in large quantities, and it has found a hundred new uses."

Foreign competition does not worry this great British ironmaster. "Of course," he said, "With the enormous population of America it was impossible that England could retain her premier position. America was bound to forge to the front, and have scope for her commercial enterprise. Her progress and that of Germany is not at all a question of tariffs and when people come and clamor to me about the Germans getting this trade and the other, I say—'Good heavens, they are bound to get something, and if I can't hold my own, the sooner I get out of the business the better.'"

The Younger Generation.

On the caliber of the younger generation, the president of the Iron and Steel Institute takes a hopeful view. "Of course," he said, with a twinkle of humor, "We all of us think the youngsters are nothing like as good as we were; but I don't think the world is going to stop when I turn my face to the wall. I have never joined in the cry of the inefficiency of English education. I think we have got a pretty good education and all we want is to take more advantage of it. Of course, the trade instruments are more complicated than they were and we want trained minds to handle them, and I think we are getting them. The younger generation is very promising."

Sir Hugh added that it was difficult to say to which country most honor was due in the cheapening of production. The idea of handling material by machinery was largely due to America, but Great Britain did not seem to have been very much behind in adopting them.

On the question of education, Sir Hugh remarked that this was a matter in which he had taken an almost life-long interest, having been very active in promoting secondary education. For many years he was chairman of the school board of Middlesbrough and only resigned through pressure of work. When the act of 1902 was passed, the town invited him to become chairman of the education committee, and he had since held that position. They had never had the slightest difficulty, and he did not believe that Middlesbrough had ever produced such a person as a Passive Resister. He was not keenly interested in religious education. But at the same time, he should greatly regret the disappearance of the Bible from the English education for the simple reason that is was the only really literary book they had in the schools, and he had often observed that no Englishman ever made a great speech and very few Englishmen spoke at all without either quoting from some Bible story or a passage from Shakespeare. They could always depend upon Englishmen understanding their scriptural illusions, a circumstance in which they differed entirely from Frenchmen.

Municipal Progress.

Sir Hugh added a number of interesting reminiscences with regard to municipal and other developments, remarking in particular that Middlesbrough was the first corporation to acquire its waterworks by compulsion, though he believed its gave quite a quarter of a million too much for them. In conclusion the genial baronet assured the interviewer of the complete kindliness of his regard for the great American competitors and his admiration for the progress made by the iron trade of that great republic.

The Manor House.

Exceptional antiquarian interest attaches to the Manor House of Mount Grace, of which a picture accompanies this article. This is one of the most valued properties of Sir Hugh Bell. It was the old guest house of the monastery, built between 1390 and 1420. On the suppression of the monastery, the property passed ultimately into the hands of the Lascelles, and one Thomas Lascelles in 1654 pierced the windows and built the church. The house had become ruinous when Sir Lowthian Bell purchased the estate. Its new owner restored it as it now stands.

Our acknowledgements are due for the excellent photographs kindly placed at disposal by Sir Hugh. It will be seen that his residence at Rounton Grange, Northallerton, exhibits a flag flying, which, it may be explained, is the outward and visible sign of his Lord Lieutenancy. Sir Hugh sets the highest value, among his possessions, upon the Carthusian monastery of which through his father's purchase he is the fortunate owner, and which is one of the most interesting relics of mediavel times in the north of England. There are only eight such monasteries now existing in the kingdom.

THE BLAST FURNACE - VI.

BY HORACE ALLEN

Seeing the enormous demand there is for pig iron to supply the world's increasing demand for steel and wrought iron, there being produced in the United States alone no less than 70,000 to 73,000 tons per day, and taking into consideration the magnitude of the supply of fuel necessary under present methods of manufacture, there are two important questions to be dealt with by metallurgists and chemists, viz., (1) can the by-products from blast furnaces be more effectively recovered and profitably applied? (2) can an equally satisfactory material be produced by either new methods, or modifications of existing ones?

Roughly speaking, each ton of pig iron requires under existing methods the expenditure of over one ton of coal chiefly in a prepared form deprived of its volatile constituents, and known as coke. While the iron ore, flux and coke are charged into the furnace at atmospheric temperature, the furnace discharges products at high physical temperature, approximately:

Furnace Products.		Physical temperature Equivalent to a coal consumption of
1. Molten metal,	2,240 pounds	92 pounds.
2. Molten slag,	1,120 pounds	77 pounds.
3. Molten slag,	13,328 pounds	120 pounds.

In regard to the utilization of the heat carried out of the furnace by the molten metal, no satisfactory means have yet been devised, owing to the difficulties to be contended with. It has been attempted to recover some of the heat carried out by the slag, but also in this case no considerable success has been attained; in England it has been applied to the evaporation of brine in connection with salt manufacture. Where the waste gases are burned under boilers, and in stoves for heating the blast, some of the physical heat is saved through there being no necessity for cooling the gases previous to their introduction to the stoves or boilers, the high temperature being an advantage in promoting combustion with the cold air.

In the direction of utilization of the by-product slag various more or less satisfactory methods have been devised, such as the manufacture of paving blocks, artificial stone, concrete flags, slag cement, slag sand, slag bricks, slag mortar, slag wool; but owing to the large quantities produced, the most economical and profitable methods of utilization are those which can be made to deal with the whole of the slag. In any of the applications of slag instances above only a comparatively small proportion of slag produced can be turned to profitable account, and as the slag continues to accumulate, it must either be dumped upon land at an expense for haulage and rent, or carried to some free deposit at the cost of carriage, etc. In some local cases instead of having to incur expense, a small price is paid for the slag for road making, etc., and this is probably the most profitable, if the whole of the slag can be disposed of; the other applications, while bringing in a return, can chiefly be said to off-set the cost of dealing with the bulk produced.

In regard to the utilization of blast furnace slag for the manufacture of Portland cement, it must be borne in mind that, without careful analytical selection, combined with calcination, the slag will only form a substitute for the usual addition of sand in cement mixture. Regardless of the claims of inventors crude slag, however finely ground only forms the nucleus for the active cement to combine with. The writer has made a special study of this question and cannot too strongly advise managers to carefully scrutinize the claims of any advocate for the employment of slag for a substitute for Portland cement. The cost of grinding to the necessary fineness must also be taken into consideration.

Instead of calculating upon the value of the prepared slag at the price of real cement, the real value here is on the sand usually mixed with cement in structural employment, unless it is used in admixture with cement clinker and subjected to calcination. The above remarks do not refer to slag cement and mortar, both of which may be of fairly good quality, but fall short of Portland cement. Certain classes of blast furnace slag can be utilized in the manufacture of Portland cement, as already indicated, and considerable quantities are employed in the building of docks, breakwaters, foundations, etc., and the following particulars may be of service in this connection:

Tri-calcium silicate

Formula	Ratio CaO to SiO_2	Per cent CaO	Per cent SiO_2
3 CaO SiO_2	2.8	43.68	26.32

This is constant in volume and hardens well, though slowly, but 3½ CaO to SiO_2 is not sound.

Di-calcium aluminate

Formula	Ratio of CaO to Al_2O_3	Per cent CaO	Per cent Al_2O_3
2 CaO Al_2O_3	1.1	52.38	44.62

sets quickly with good hardening properties and constant volume; while 2½ CaO to 1 Al_2O_3 does not give a sound result.

The writer considers that the following formula should be approximated in percentage proportions:

$$CaO = (SiO_2 \times 1.86 \text{ to } 2.8) + (Al_2O_3 \times 1.1 \text{ to } 1.64)$$

But the chemical analysis is of little service in determining the quality of the cement in the absence of particulars of manufacture and physical tests. The content of lime in good cement ranges up to 66 per cent; magnesia may be up to 2 per cent, but not higher.

Flour is most suitable when the cement is to be mixed with sand, but if the cement is to be used neat it should be of a rougher quality. The chemical constiution of Portland cement of good setting quality must in its chief constituents be within the

Lime (CaO) .....47 to 60 per cent.
Silica (SiO_2) .....20 to 35 per cent.
Alumina (Al_2O_3) ... 5 to 15 per cent.
Magnesia (MgO) less than ..... 3 per cent.

From the above, it will be evident that slag containing a higher proportion of magnesia than 3 per cent must be used very sparingly in admixture with cement clinker to keep the proportion of magnesia within the limit given, and the proportion of sulphur, or sulphuric acid, must be kept low, if good sound results are required.

A rough calculation shows that the total weight of cement imported from England and Europe to over-sea countries only amounts to about 1-25 of the slag produced in the United States alone.

U. S. STRIKE STATISTICS.

Industrial troubles in the United States during the year 1905 affected a less number of employes than in any other year since 1892. In the year 1905 there were thrown out of employment 221,686 employes by 2,077 strikes undertaken by 176,337 strikers in 8,292 establishments, according to the annual report of the bureau of labor of the department of commerce and labor. During the period of 25 years from 1881 to 1906 the greatest number of strikes in any one industry in the United States was in the building trade, which had 26.02 per cent of all strikes and 38.53 per cent of all the establishments involved in the strikes. In the coal and coke industry were 9.08 per cent of all strikes and 9.39 per cent of all establishments involved in the strikes. This latter had more employes thrown out of work by strikes than any other industry. The building trades were second in order in both these respects, with the men's clothing and iron and steel industries next. During the 25 years, the striking employes succeeded in winning all the demands at 47.94 per cent of the establishments, succeeded partly in 15.28 per cent, and were wholly defeated in 36.78 per cent.

Believes Coal Limited.—The statement that at the present rate of consumption the anthracite deposits of the United States will be practically exhausted in 75 years is attributed to Edward T. Parker of the United States geological survey. Mr. Parker urges manufacturers to use bituminous coal, and declares that the smoke nuisance will soon be abated as a result of experiments now being conducted in New York. "Hard coal will never be cheaper to consumers than it is now," says Mr. Parker. "The production of anthracite in 1906 was 63,645,010 tons. According to one coal expert, the anthracite available for mining in 1901 was 4,765,216,750 tons."

The Washington Iron Works of Seattle recently purchased 500 tons of castings from eastern foundries. On account of the molders' strike, the plant got behind on its output during May and June and the above order was placed to fill the discrepancy. J. M. Frink, president, reports that the plant is now running at practically its full capacity.

THE INFLUENCE OF THE CONDITIONS OF CASTING ON PIPING AND SEGREGATION, AS SHOWN BY MEANS OF WAX INGOTS.[1]

BY H. M. HOWE AND BRADLEY STOUGHTON

This paper presents an experimental verification of some of the predictions made by one of us[2] concerning the influence of certain conditions of casting upon the size and position of the pipe, and the position of the segregate, in steel ingots. The predictions which we have been able to verify are the following:

A. That the pipe is shortened and the segregate raised:

1. By slow casting;
2. By casting with the large end up instead of down;
3. By retarding the cooling of the top, e. g., by means of a sinking-head.

B. That the pipe is shortened by slow cooling.

C. That the pipe and segregate lie in the last freezing-part.

Our procedure was to cast ingots of wax (commercially pure stearic acid) containing a little bright green copper oleate (usually 1.5 per cent) under varying conditions; to saw each ingot open along a longitudinal plane passing through its axis; and to examine the longitudinal section thus laid bare. In order to make the segregate or enriched part more distinct in color from the impoverished part, a very little red cerasine was added. An experiment which will be described later showed that the cerasine itself does not segregate markedly, if at all. Hence we may assume that the strong contrasts between the green and red shown in so many of our ingots are due, not to segregation of cerasine, but to that of the green oleate, in the wax which in itself is uniformly reddened with cerasine.

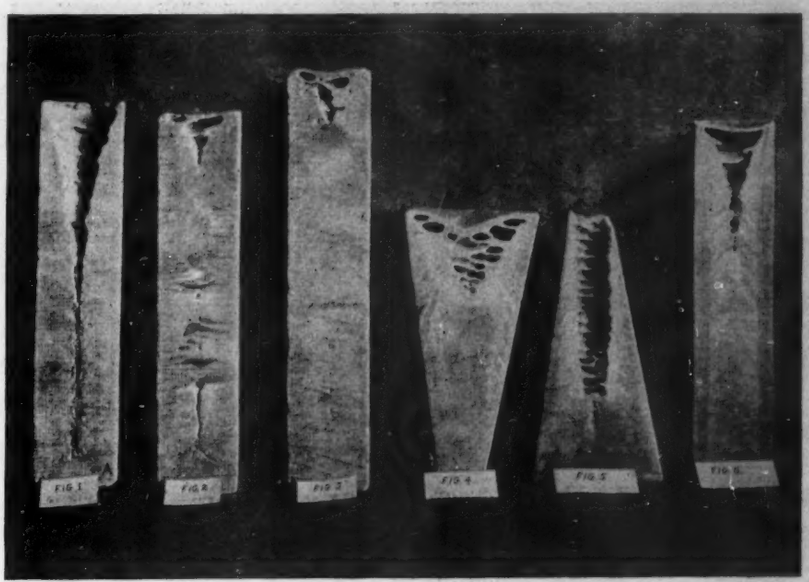
The wax ingots themselves, shown while presenting this paper, of course have not been tampered with in any way. But the contrasts between the red and green, so beautiful in these originals, make so little showing in a direct photograph that, in order to show them we had to paint a photographic print so as to strengthen them, and then re-photograph this print. This, in turn, is because the difference in photographic value between the green and the red is so slight.

[1]A paper presented at the New York (April, 1907) meeting of the American Institute of Mining Engineers. Copyright 1907 by American Institute of Mining Engineers.

[2]Respectively Professor and Adjunct Professor of Metallurgy at Columbia University, New York.

[3]Piping and Segregation in Steel Ingots, by Henry M. Howe, *Bi-Monthly Bulletin*, American Institute of Mining Engineers, No. 14, March, 1907, pp. 169 to 274.

Taking up the evidence in detail, the influence of the rate of casting is shown in ingots Nos. 1, 2 and 3, Figs. 1, 2 and 3. Of these we cast Nos. 1 and 2 from the same casseroleful, half of which we transferred to a second casserole just before casting. We began the casting of these two at the same instant; but whereas the casting of No. 1 was finished in 30 seconds, that of No. 2 was so slow



Fast pouring. Poured fast at first, then slowly. Poured very slowly. Large end up. Large end down. Hot top fast cooling.

that, though it was continuous except for momentary interruptions for heating the wax, it lasted 1 hour and 13 minutes.

The pipe in the fast-poured No. 1 stretches down 90 per cent of the ingot's length, and, except for some very thin bridges, is practically continuous for 49 per cent; whereas in the slowly-cast ingot the pipe stretches down only 14 per cent of the length of the ingot. In this particular ingot (No. 2) there is a second rudimentary pipe near the bottom, caused by our accidentally pouring at first faster than we intended. In ingot No. 3, which was poured slowly from the start, this second pipe is absent.

The segregate in the fast-poured ingot No. 1, though not strongly marked, can be traced at *A*, Fig. 1, as a dark pear-shaped mass, near the bottom of the ingot. The slowly-cast ingot No. 2 has rather a succession of local axial horizontal segregates than a single segregate, as is easily understood from the extremely slow rate of casting. In the still more slowly cast ingot, No. 3, these local segregates are so slight as almost to escape notice, and there is no noticeable single segregate.

The effect of casting with the large end up instead of down is shown in Figs. 4 and 5, which represent two ingots cast in immediate succession and under otherwise like conditions from the same casseroleful.

The pipe stretches down only 30 per cent of the ingot's length when the large end is up, but 82 per cent when the large end is down, and in the latter case is a large and practically continuous cavity for 69 per cent of the ingot's length, save for the fairy-like transparent bridges.

The segregate lies well above the center in the ingot with the large end up, but very near the bottom in that with the large end down.

The difference in size between the top and bottom of these ingots, i. e., their taper, is very much greater than in practice, with the purpose of exaggerating the effect of the direction of taper so as to make it clear to the eye.

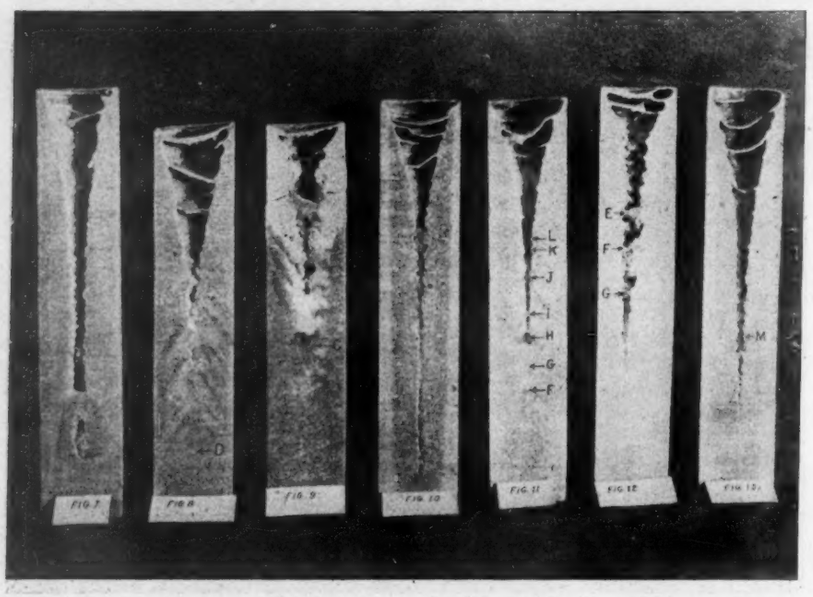
The effect of retarding and hastening the cooling of the top of the ingot is

shown in Figs. 6 and 7, and in Figs. 8 and 9. The preparation of ingots Nos. 6 and 9 is described later.

The depth to which the pipe reaches as a nearly continuous cavity is only 26 per cent of the ingot's length in the hot-topped ingot, No. 6, but 85 per cent in the cold-topped, No. 7, and the extreme distance through which it can be traced is only 37 per cent in the hot-topped against 85 per cent in the cold-topped one. To put this in another way, if steel ingots should pipe like these, the part in which the pipe would be so oxidized that it certainly could not be welded would be only 26 per cent in the hot-topped ingot against 85 per cent in the other.

The segregate lies well below the middle of the pipeless part of the cold-topped ingot No. 8, but well above that of the hot-topped ingot No. 9. This pair of ingots does not show so well as Nos. 6 and 7 the influence of the distribution of temperature on the position of the pipe, because the temperature-lag of the slowly-cooling part was extremely slight, whereas in Nos. 6 and 7 it was very great. It is this temperature-lag, rather than the time-lag, that determines the depth of the pipe. The reason why retarding the cooling of the top shortens the pipe is that the upper part remains molten and thus ready to feed down into the pipe when, late in the piping-period, the inner walls are drawing outwards because of their adhesion to the virtually expanded outer walls. In order that this downward-feeding shall have a marked effect in shortening the pipe, the upper part must remain soft enough to sag thus up to the time when a large amount of the outward-drawing of the lower part shall have taken place, i. e., until the freezing of the lower part shall have become very far advanced. But this implies that the temperature of the lower part must be much below that of the upper part, or in short that there must be a large temperature-lag.

The effect of the rate of cooling is shown in Figs. 8, 9 and 10. The pipe in the fast-cooled No. 10 runs down the axis for 91 per cent of the ingot's length, and then branches at 45 degrees to right and left towards the ingot's corners, following the path of the junction of the columnar crystals like that so often seen in steel ingots. In the slowly-cooled Nos. 8 and 9, the pipe stretches down 61 and 45 per cent of the ingot's length, or in both cases very much less than in the fast-cooled ingot.



Cold Top. Fast Cooling. | Cold Top. Slow Cooling. | Hot Top. Slow Cooling. | Warm Top. Fast Cooling. | Warm Top. Fast Cooling. Surface Tension Bridges. | Lateral Deflection. Warm Side. | Cool Side. | Fast Cooling Ruined Surface Tension Bridges.

We had great difficulty in preventing this pipe-lengthening effect of rapid cooling from being masked by the pipe-shortening effect of the slower cooling of the top than of the bottom which naturally accompanies rapid freezing; and, of the two, the relative rate of cooling of the top and bottom is likely to outweigh the absolute rate of cooling, in its influence on the depth of the pipe. It was easy enough to cool the lower part of the ingot quickly, by setting the mold in iced water; but under these conditions the top lagged far behind the lower part, because from the top the heat necessarily escaped only very slowly into the air. We could not cover the ingot-top with our iced water, because that is so much heavier that it would run right down through the molten wax. Covering the ingot-top with a cold object helped us but little, because as soon as the mass began to settle an air-space formed above the wax itself, and through this air the heat passed only slowly. With ingot No. 10 we finally hit on the device of exposing it to the outer air on a very cold winter's day, with a good wind blowing. This seemed to give us about as near an approach to uniform thermal conditions at the top and bottom as could be hoped for, though the cooling of the top must still have lagged somewhat behind that of the bottom.

In slow cooling, though we saw no way of making top and bottom cool at exactly the same rate, yet we could make the difference of rate extremely small, and we could readily reverse its sign, by varying the strength of the small gas-flames played against the top and bottom of a vertical closed iron cylinder, Fig. 14, within which stood our mold, separated from the walls of the cylinder by a wide air-space. This difference of rate between top and bottom we thus reduced so far that it no longer sufficed to mask the simultaneous pipe-shortening effect of the slow cooling itself, as is shown by comparing the pipe-lengths of ingots 8, 9 and 10. See Table I.

Here the fact that the fastest cooling was at the top in No. 8 but at the bottom in No. 10 certainly tended to make the pipe deeper in No. 8 than in No. 10; nevertheless it was actually much shallower in No. 8 than in No. 10, so that the powerful effect of the change of position of the fastest cooling-point from top to bottom has here been greatly outweighed. What has outweighed it is clearly the difference in the absolute rate of cooling of these ingots, each ingot taken as a whole. The explanation is that the slower cooling of No. 8 has shortened its pipe to a degree which greatly outweighs the pipe-lengthening effect of its cooling faster at top than at bottom. Here, then, we verify the prediction that slow cooling tends to shorten the pipe.

Segregation is much greater in slow than in fast cooling. It is true that there is a slight concentration of the oleate in the lower part even of the fast-cooled Nos. 10 and 11, and apparently in the irregular masses which cross the pipe of the former. But the difference in tint between the red impoverished parts and the green enriched ones is incomparably greater in the slowly-cooled Nos. 8 and 9 than in the fast-cooled Nos. 10 and 11, both transversely and lengthwise. Indeed the lengthwise difference, which is very slight in the fast-cooled ingots, is

so great in the slowly-cooled ones that in the upper quarter of one of them, No. 9, the downward expulsion of the oleate looks complete to the eye.

That the last freezing-part contains the pipe and segregate is shown primarily in Fig. 12, and incidentally in Figs. 4 and 5, 11 and 13, and 8 and 9.

The ingot shown in Fig. 12 had its cooling hastened on its right-hand side by circulating cold water beside it, and retarded on its left-hand side by coating it with flannel, with the purpose of shifting the last freezing-part from the axis to the left. As we foresaw, this has shifted the pipe distinctly to the left of the axis.

Table I.

Ingot No.	—Rate of Cooling— The Fastest Cooling was at	Rate of Ingots as a Whole.	Length of Pipe, in Percentage of Length of Ingot. Per Cent.
10	The bottom.	Fast.	96
8	The top.	Extremely slow.	61
9	The bottom.	Extremely slow.	45

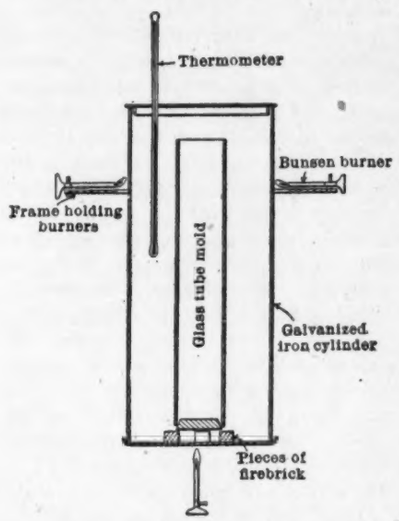


FIG. 14.—ARRANGEMENTS FOR CONTROLLING THE RELATIVE RATE OF COOLING OF TOP AND BOTTOM IN SLOW FREEZING.

The segregate, too, seems to have shifted so that it is concentric with the pipe. The bridges *E*, *F* and *G* are so much darker and stronger a green than any of the rest of the ingot that we believe that they are the central axial part of the segregate; but the indications are not conclusive.

That the segregate lies in the last freezing-part is further shown by the facts (1) that it lies well above the center of the ingot No. 4 with the large end up, but far below the center in ingot No. 5 with its large end down; (2) that it lies far above the center of the pipeless part, at *C* in hot-topped ingot No. 9, but at *D* below the center of the pipeless part of cold-topped ingot No. 8; and (3) incidentally by a curious and interesting phenomenon shown in several of our ingots, but particularly well in Nos. 11 and 13. In the middle and lower part of No. 11 there are five bridges, of which the lowest, *F*, is rudimentary, and each successive one is better and better marked as we pass upwards, until at *I* we get a distinct bridge, and at *J* one which seems to be over-ripe in a special sense. We venture to call these "surface-tension bridges," a term which we will now explain.

The pipe is due to the more rapid cooling and contraction of the inner than of the outer walls of the ingot in the latter part of the freezing. The down-sagging of the upper part of the mass tends to make the pipe narrower and narrower as we pass down the length of the ingot; hence the narrowing of the pipe at its lower end, and the gradual cessation of the rudimentary pipelets, for instance in Fig. 11.

The bright green of the copper oleate in this ingot shows that there are many local centers of segregation. The length of our ingots is so much greater than their width that the whole of the segregate does not usually coalesce into a single mass, but instead there are several local centers of coalescence along the axis of the ingot. Now it seems to us that each of these local segregates causes a local surface-tension bridge. That is to say, the crack which, as the beginning of the pipe, starts near the ingot's top and travels downwards along the axis, is interrupted at a point where the local enrichment of oleate has made the wax so fusible, soft, and plastic, that it stretches out like so much molasses candy under the strain, and thus forms a surface-tension bridge, instead of cracking open like the rest of the wax above and below, which, because it has less oleate, is less fusible, and therefore has progressed farther in the passage from the molten to the rigid state.

In evidence of this we point to the fact that each of these bridges from the rudimentary *F* to the over-ripe *J* is not only greener but very much greener than the wax between the bridges. Moreover, at *K*, *L* and other spots we find not bridges but promontories of like verdancy, which look as if they had passed through the stages now represented by *H*, *I* and *J*—as if they had once been bridges, but had later been torn apart by the widening and down-sagging of the pipe, and that, now left protruding as green promontories, they are really relics of former bridges.

Like phenomena can be traced in ingots Nos. 13 and 15, though not so clearly. Had we No. 13 alone, all that we could assert would be that the very walls of the pipe in and above *M* were very much greener than any of the rest of the mass, and that the ruined bridges above also looked greener than the surrounding wax. But when we come to interpret the phenomena here and in many of the other ingots in the light of what we see so very clearly in ingot No. 11, there seems to be no reasonable doubt that these promontories and like masses are ruined surface-tension bridges.

Segregation or Stratification.

Without better knowledge of the relations of copper oleate and stearic acid, one might naturally ask whether we really have here a case of true segregation. May not the downward concentration of the copper oleate be only the subsidence of a mechanically suspended heavy foreign body, instead of the true segregation of a dissolved impurity? And may not the concentration of red at the top of our very slowly cooled ingots be due, not to the expulsion of the green copper oleate by segregation, as we have hitherto assumed, but to the upward concentration of the red cerasine, either by segregation or by stratification? We will now offer some evidence on these points.

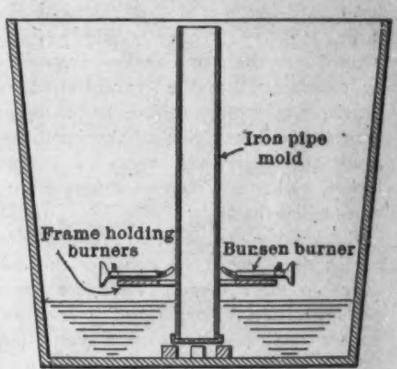


FIG. 15.—HOT TOP CASTING ARRANGEMENT. THE FREEZING PROCEEDS FROM BELOW UPWARDS.

To dispose first of the simple question whether the red cerasine concentrates upwards, we show ingot No. 14, made of stearic acid without copper oleate, but with the usual quantity of cerasine, and held molten for 1 hour and 50 minutes, to allow ample time for stratification if it does actually tend to occur, and then cooled quickly without disturbing the ingot or mold in the least, so that any stratification which should arise might persist. In spite of this ample opportunity for stratification none seems to have occurred, because the red appears

to be uniform over the whole longitudinal section of the ingot. Hence we infer that the contrasts of red and green in our other ingots cannot be due to stratification of the cerasine.

Turning, now, to the question whether the concentration of the green oleate in the slowly-cooled ingots is due to stratification or to segregation, we have to admit at once that, in several of our ingots, a small quantity of copper oleate seems to have remained undissolved, and to have sunk to the bottom of the ingot. But this applies to only a very small quantity of the oleate, and this undissolved matter is in general readily distinguished from the segregate proper, because it forms sharp grains of considerable size right against the bottom of the ingot.

Now, the mere fact that the oleate in general lies well below the center of the ingot may be explained either by the simple stratification of a heavy suspended solid, or by the greater density of the segregate due to its enrichment in the heavy copper oleate. And even the fact that in certain cases the segregate lies above the center of the ingot (the hot-topped ingots and that cast with the large end up), can readily be explained on the stratification hypothesis by supposing that the concentration by gravity was more complete in the upper than in the lower part of the ingot, because the upper part remained molten longer, giving stratification a longer time to complete itself.

But this stratification explanation breaks down when we consider the evidence in more detail. Thus the upper parts of ingots Nos. 6 and 9 remained molten and quiescent for a very long time, 1 hour and 4 minutes, and 1 hour and 45 minutes, so that, if the impoverishment of the upper part of No. 9 was due to mere subsidence of a suspended solid, the upper part of No. 6 should have been impoverished to a comparable degree. But the impoverishment in oleate, while in the upper quarter of No. 9 it has gone so far as to approach complete expulsion, in No. 6 is very slight. The difference in impoverishment in these two cases is far too great to be explained by the stratification-hypothesis, but it is just such a difference as should result from the great difference in the rate of freezing, which was extremely rapid in No 6. but extremely slow in No. 9.

No. 6 was cast in an iron mold standing in a large empty tub, Fig. 15. Four very gentle flames from horizontal Bunsen burners were played against the lower part of the mold, and the frame which carried these Bunsen burners was raised slowly as the tub was gradually filled with iced water, the surface of which kept pace with the Bunsen burners slightly above it. During the very slow upward travel of the water and the flame, the upper part of the ingot had over an hour in which the copper oleate, had it been mechanically suspended, would have sunk downwards; but, when any given horizontal layer of wax once began to freeze, it was rapidly frozen by the iced water.

No. 9, on the other hand, was surrounded by a hot-air jacket, as in Fig. 14, slightly hotter above than below, and the temperature of this jacket as a whole was very gradually lowered, so that there was not only a slow approach to the freezing-range, but a very slow passage through that range, instead of the rapid passage which took place in No. 6.

As we pass inwards from the outer shell of ingot No. 6, we find first a dark band in which the freezing seems to have been so rapid as to restrain segregation very greatly. This is followed by a band in which the red predominates, and this in turn by the axial region in which the green predominates. Here we have exactly the sequence which we find in a steel ingot: an outer region but little impoverished; then a region of maximum impoverishment, followed by the axial region of maximum enrichment.

That even a true segregate should, if it is denser than the mother-mass, concentrate towards the lower part of the ingot, is only natural, as one of us has explained in case of the deep-seated segregate in ice ingots.[4]

The green surface-tension bridges already noticed are further evidence in this same direction; and so are the diagonal streaks which we will consider later.

Though this reasoning seemed to us persuasive, we supplemented it by a direct experiment, the results of which seem absolutely irresistible. Stratification is a thing which occurs both before and during freezing, but segregation occurs only during freezing. Therefore, if we hold the mixture of wax, oleate, and cerasine molten for a very long time, longer than in any of the preceding cases, so as to afford ample time for stratification proper, and then cool it rapidly past the freezing-point so as to leave but little time for segregation; then if our phenomena are really of stratification, the upward concentration of the red and the downward concentration of the green should be extremely strong in the resultant ingot. If, on the other hand, our phenomena are not of stratification but of segregation, then there should be only the moderate color-contrasts which the other fast-cooled ingots show.

Therefore we held ingot No. 15 molten for one hour fifty minutes, or longer than in any of the other cases, in an iron mold within a closed air-chamber, as in Fig. 14; and then, without moving the mold itself or otherwise disturbing and stratification which might have occurred, we froze the wax rapidly by pouring cold water into the air-space which surrounded the mold. The water rose smoothly in this outer air-space, and there was nothing to disturb the wax in its mold. As may be seen, there is only the slight color contrast which the other quickly-cooled ingots show, and nothing resembling the extreme downward concentration of the green and upward concentration of the red which the slowly-frozen ingots, such as Nos. 8 and 9, show so strikingly.

The inference seems to us irresistible that the color-contrasts in these slowly-frozen ingots are due not to stratification but to true segregation. Hence it further seems that the evidence which this paper offers as to the influence of the several variables on segregation is true and valid evidence.

The Diagonal Streaks.

Early in this investigation we noticed curious diagonal streaks stretching inwards and upwards from the outside of certain ingots. Nos. 4, 6, 8 and 11 show these streaks in what we think nearly their natural position, and Nos. 5 and 9 show them distorted by sagging, as we will now try to explain. For brevity we will describe these in positive terms, but with the understanding that we put forth our explanation tentatively in spirit.

The red diagonal bands are the first-freezing crystals, which stretch out into the molten mother-wax. In freezing, they naturally reject part of their dissolved copper oleate, which thus concentrates in the spaces between them. They probably at first shoot out at right angles to the sides of the ingot, the cooling-surface; but from this horizontal position their inner ends swing upwards, because they are lighter than the molten wax into which they protrude, certainly because they contain less of the heavy copper oleate, and perhaps also because of the expansion of the wax in freezing. That part of the heavier molten mother-wax which is entangled or engulfed between these upward-pointing early-freezing growths, may thereby be prevented from running down to join the rest of the segregate in the lower part of the ingot; and, where opposite branches meet in the axis of the ingot, the locally-imprisoned segregate later forms one of the surface-tension bridges.

But, if there is much sagging of the mass, these upward-pointing trees are more or less bent downwards by it, and this downward bending increases with the amount of sagging. Thus there could be but little sagging in No. 4, cast with the large end up, because the freezing proceeds from below upwards; and in No. 5, with its large end down, there is

[4] *Bi-Monthly Bulletin*, American Institute of Mining Engineers, March, 1907, page 234.

Table II.—Details of Preparation and Description of the Wax Ingots.

Ingot No.	Laboratory No.	Preparation. Quantity of Copper Oleate.	Length.	Diameter.	Material of Mold.	Mold Surrounded By:	Rate of Cooling.	Rate of Pouring.	Description. Depth of Pipe in Percentage of Length of Ingot. Total Depth.	Depth of Continuous Part.	Depth of Center of Main Segregate in Percentage of Length of the Ingot.
		Per ct.	In.	In.							
1	21	1.5	9½	2	Iron.	Cold water.	Fast.	30 sec.	90 ±	49 ±	Uncertain.
2	22	1.5	9¼	2	Iron.	Cold water.	Fast.	1 hr. 13 min.	14	14	66 ±
3	34	0.75	10¼	2	Iron.	Cold water.	Fast.	1 hr. 39 min.	13	13	56
4	24	1.5	6¾	*a* Large end up.	Wood.	Air.	Intermediate.	50 sec.	30	30	41
5	23	1.5	6¾	*a* Large end down.	Wood.	Air.	Intermediate.	55 sec.	82	69	94
6	37	1.5	9	2	Iron.	Ice-water.	*b* Fast.	30 sec.	37	26	94
7	26	1.5	10½	2	Glass.	*c.*	Top fast, bottom slow.	40 sec.	85	85 *d*	85 ±
8	38	1.5	9⅝	2	Glass.	Hot-air jacket.	Very slow, 1 hr. 40 min.	48 sec.	61	47	86 ±
9	39	1.25	9⅝	2	Glass.	Hot-air jacket.	Very slow, 1 hr. 45 min.	35 sec.	45	21	59 ±
10	35	1.5	10¼	2	Iron.	Air with wind.	Very fast, about ¾ hr.	25 sec.	96	33 ±	34 ±
11	15	1.5	10¼	2	Iron.	Ice-water.	Very fast.	2 min. 55 sec.	80	45	84 ±
12	27	1.5	10½	2	Glass.	*e.*	Fast on one side, slow on other side.	40 sec.	72	30	31 ±
13	18	2.5	10½	2	Iron.	Ice-water.	Very fast.	51 sec.	81	56	62 ±
14	40	0	9¾	2	Iron.	Running cold water.	Fast 1 hr.	50 sec.	53	53	.....
15	41	1.5	9¾	2	Iron.	Running cold water.	Fast 1½ hrs.	55 sec.	85	37 ±	38

a Pyramidal ingots, 3¼ inches square at the large end and 1 inch square at the small end.

b Hot top. The mold, which stood within a tank, was heated near its lower end by four small gas-jets, which were very slowly raised, while at the same time iced water was run into the tank just fast enough to keep its upper surface at a slight but nearly constant distance below the gas-jets. Thus the freezing at any given level was very rapid, but the freezing-zone traveled upwards very slowly. From the time the iced water rose to the bottom of the mold, till the time when it reached the top of the mold, was about one hour. Thus we forced the freezing to take place from below upwards.

c Cold top. The upper part of the mold was cooled by jacketing it with a movable coil of rubber pipe, through which cold water circulated, while the lower part was warmed by jacketing it with a fixed coil of wire heated by electric resistance. The cold jacket was lowered gradually from the top of the mold to within about 2 inches of the heating-jacket, a travel of about 6 inches in 1 hour and 15 minutes. Thus we forced the freezing to take place from above downwards.

d The continuous part of the pipe reaches nearly to its bottom, and extends through the thick bridge which, in the lower part of Fig. 7, masks it.

e Lateral deflection. The cooling of the right-hand side of the mold was hastened by jacketing it with vertical rows of rubber tubing, through which cold water circulated for 1 hour and 10 minutes; and the cooling of the left side was retarded by jacketing it with flannel. Thus we shifted the last-freezing region from the axis towards the left.

very great sagging, because freezing proceeds from above downwards, as the shallow pipe in No. 4 and the deep one in No. 5 prove. It is in perfect accord with our ideas that the streaks in No. 4 point more nearly vertically upwards than in any other ingot, and that in No. 5 they are much more nearly level. In the suddenly-cooled No. 11 these streaks point strongly upwards, a natural consequence of the rapidity of cooling, which has given little time for sagging to take place; witness the great depth of the pipe. In No. 8, though the slow cooling has given plenty of time for sagging, there has actually been but little because of the cold top, which has led to a deep pipe; and it is quite in accord with this that the streaks point strongly upwards in spite of the slow cooling.

Finally, in the slowly-cooled hot-topped No. 9, both the slow cooling and the fact that the upper part remained molten and free to feed down into the pipe, led to so much sagging as both to cause a short pipe and to overturn these initially upward-pointing trees, and make them point downwards. In this case the sagging was so extreme that the ingot shortened itself by about 5 per cent. Thus in every respect the position of these streaks agrees with our explanation of their na-

We have to thank Dr. Parker C. McIlhiney most warmly for aid in choosing these substances, copper oleate and cerasine, for showing these effects of segregation; and Mr. E. C. Groesbeck, S. B., for his careful and efficient execution of most of the manipulation.

PROGRESS OF THE ATIKOKAN IRON CO.

The new furnace of the Atikokan Iron Co. at Port Arthur was blown in July 17 and is working very nicely though the nature of the ore used and the newness of the entire plant require more or less of experimental operation. Three heats are being run off every day and though a considerable quantity of off iron has been made, due more to the richness of the ore, which is low in silica and manganese, than the newness of the plant, it was not expected, as the furnace was started on a charge proportioned the same as though for ordinary Lake Superior ores with the object of determining just what the ore from the company's Atikokan mine would do.

This ore is a magnetite of massive form carrying pyrites to an extent that requires roasting previous to charging into the blast furnace. It runs 60 per cent or better in iron and has been used as the entire burden up to this time. While the time has not yet permitted the obtaining of any conclusive results, the refractoriness of the ore with its effect on the heating cost and the richness of

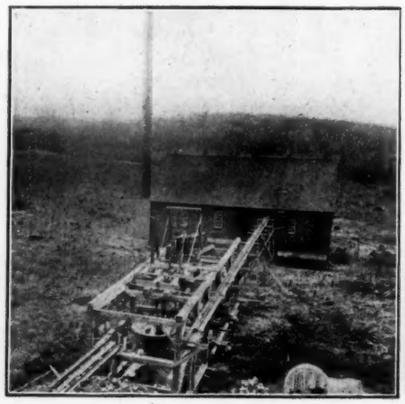
the ore may require a mixture with a more easily reduced and siliceous ore. A part of the company's ore deposit consists of an altered magnetite or limonite, a soft ore which may serve this purpose.

As described in a recent issue of THE IRON TRADE REVIEW, the plant has been spendidly built and equipped. The roaster is not working smoothly as yet, but for the most part the accessories of the furnace are operating satisfactorily. Labor there is expensive and inexperienced and, so far as possible, it has been replaced by automatic devices.

The mine is shipping 300 tons daily and it is claimed can be made ready to ship as much as 1,000 tons daily in ten days. The deposit lies in a hogback or dyke rising about 125 feet above the swamp level and extending in a general northeast and southwest direction about 4,000 feet. The ore lies in three veins running the entire length of the ridge, outcropping a part of the distance and extending down to a depth already explored of 320 feet. These veins are 44 feet, 14 feet and 10 feet wide respectively and from the drilling which has been done for a thousand feet either way from the center of the ridge it is estimated there are in the neighborhood of 5,000,000 tons in the ore body.

The deposit was first opened up by putting a tunnel through the ridge near the bottom, crosscutting the ore veins. The entrance to this tunnel is shown in one of the views. This tunnel is 8 feet by 14 feet and cuts the 44-foot vein 60 feet in from the mouth. In this vein a chamber 24 feet by 30 feet has been opened up and from here two divergent raises are being put up in line with the vein. These will open out on top of the ridge and the ore will be milled down. Practically all of the ore except the modified magnetite at one end has to be blasted and in the edges of the vein it is rather intimately associated with the rock walls.

Most of the ore is now being shipped, however, from an open cut on the side of the ridge and in the future most of the ore will be obtained that way. It is not probable that any more tunnels will be built. The surface is very light and for the most part it is claimed, can be blasted away from the ore very cleanly and with little difficulty. The ore is run by gravity in small cars to the crusher and the empties are pushed back by hand. The soft ore is wheeled directly in to the cars over a platform.



POWER HOUSE AND CRUSHER, FROM TUNNEL MOUTH.

POWER HOUSE AND CRUSHER, LOOKING ALONG RIDGE.

GENERAL VIEW OF MINE SHOWING ENTRANCE OF THE TUNNEL THROUGH THE RIDGE.

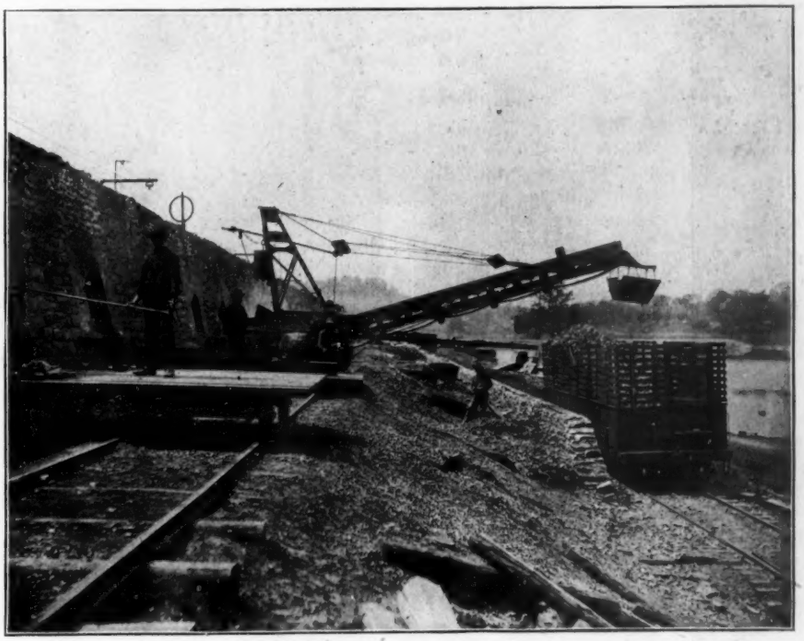
This is the only developed property near Port Arthur though some exploring has been done a little to the west. In the Loon Lake and Manitowan districts, concerning which such unwarranted reports were published last December, no new exploratory work has been done. The ore there is largely siliceous and is banded with jasper. It runs high in manganese also in many places. The ore lies for the most part in a blanket formation between layers of lean taconite.

The Western Pacific Railroad Company is completing its road towards San Francisco. It has let two contracts for work in that city. One contract was awarded to the Western Construction Co. for extensive grading from the vicinity of Islais creek northward into the heart of the city, at Ninth and Brannan streets, at $1,000,000. The other contract of $700,000 was awarded to Healy & Tibbitts for the construction of a long mole with ferry and freight slips on the Oakland side of the bay, just northward of the estuary.

The Chattanooga shop of the United States Cast Iron Pipe & Foundry Co. has closed down for lack of iron.

SEARIGHTS PLANT OF TAYLOR COAL & COKE CO.

The Taylor Coal & Coke Co., of Cleveland, which began operations in the Connellsville region about a year ago, has one of the most modern and improved plants in that section at Searights, Pa., which is on the "low phos" branch of the Monongahela railroad, about half way between Brownsville and Uniontown.



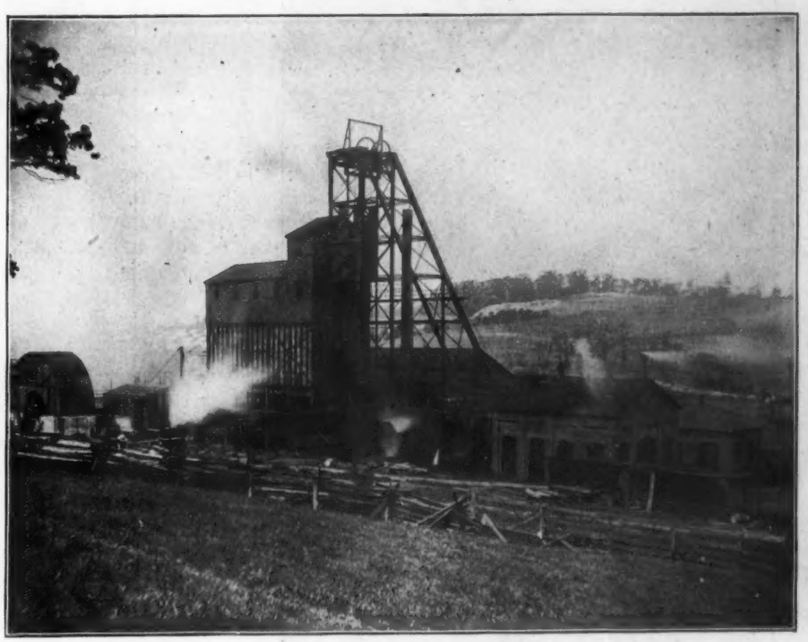
COVINGTON COKE DRAWER.

The new operation has a daily output of about 600 tons of coke with additions under way which will shortly increase the capacity to about 1,100 tons per day, and to a considerably larger quantity than this within the next two years.

The plant is notable in many respects, ranking among the best operations in the district, and was designed and built by Heyl & Patterson, Inc., of Pittsburg. The property is bounded on the north by the Keister mines of the Lincoln Co.; on the east by the Connellsville Central low phos mine, Dearth plant of the H. C. Frick Coke Co. and the Solon plant of the Prospect Coal & Coke Co.; on the west by the property of the Brier Hill Coal & Coke Co. and on the south by the new plant of the Connellsville Central Coal & Coke Co. The holdings are practically 900 acres of land with an underlaying working seam of nine feet ten inches of good coking coal.

Mine Openings and Operation.

There are two openings to the mine, the main shaft, through which the coal is taken from the mine, and a second opening which is a slope driven in on a 19-degree angle and is used as a supply entry and is designed for haulage and manway, affording safe exit for the miners without the aid of hoisting machinery at the shaft opening.



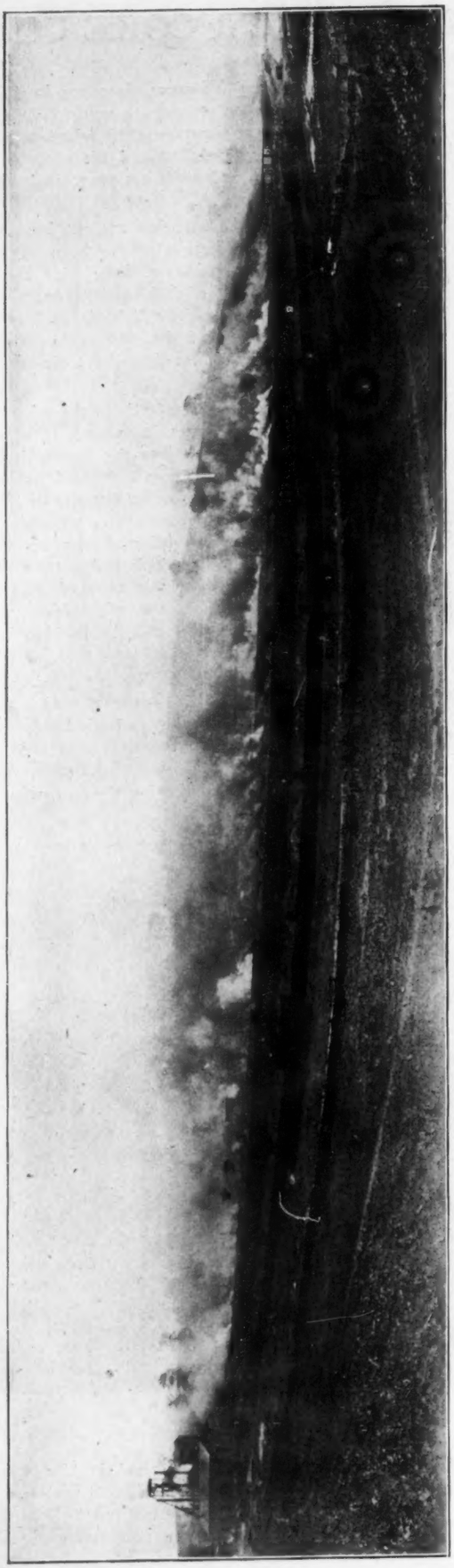
TIPPLE AND POWER PLANT.

There are 25 entries and 50 working rooms, and 100 room places are in shape to start, as ovens are completed. At the present time the north drift has been driven in 2,800 feet and the south drift 1,500 feet, and work has progressed 2,000 feet to the east.

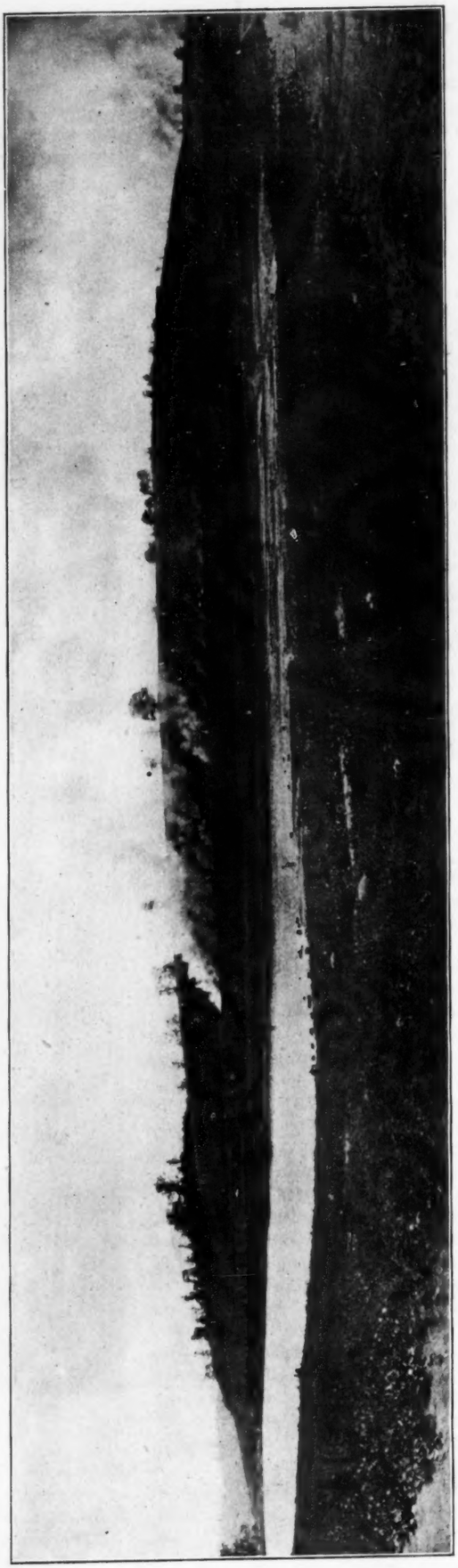
Electric haulage has not yet been installed, but contracts have been let for a complete equipment. The mine in the vicinity of the shaft and through the slope is electrically lighted, and it is the intention of the owners to extend the electric system throughout the operation.

The coal is brought from the mine by self-dumping cages in two-ton cars and delivered directly into the larry storage bin. The head frame, as well as this bin, which has a storage capacity of 1,000 tons, is of steel construction throughout. It is lined with reinforced concrete with sides four inches thick and bottom five inches. The bottom is equipped with 18 standard roller gates through which practically all of the coal in the bin can be discharged into the larry cars.

There are two leveling and distributing conveyors installed over the bin, and these distribute the coal discharged by the self-dumping cages, making the bin level full, utilizing the entire storage capacity and eliminating the loss of storage space usually found in bins where provision has not been made against coal piling. There is a steel trestle from this bin leading to the two banks of coke



First Block of Ovens, Power Plant at Left.



Second Block of Ovens and Reservoir.

ovens, the coal being supplied to the latter by electric larry cars.

Power Equipment.

The combined boiler and power house is of very substantial fireproof construction. The walls are brick, the floor reinforced concrete, and steel trusses support the slate roof. The building containing the boilers is 44 feet wide by 100 feet long and that part containing the engine and generator unit is 44 feet by 35 feet. The boiler plant consists of six 150-horsepower Erie City return tubular boilers working under a steam pressure of 125 pounds per square inch, arranged in three batteries with floor space for another battery of two boilers. The fuel coal is delivered to the boiler house directly from the storage bin through a system of chutes. The boiler plant is equipped with a Cochrane feed water heater, capable of heating and purifying 5,000 gallons of water per hour; also two duplex boiler feed pumps 10-inch steam cylinders, 6½-inch water cylinders, manufactured by the Hall Steam Pump Co. The electrical equipment at present in the power house consists of one 250-kilowatt, 275-volt, 200-revolutions per minute Bullock generator, built by the Allis-Chalmers Co., direct connected to a 21 x 20 Ball engine, built by the Ball Engine Co. Provision has been made for an additional generating unit. The switchboard is three-panel of Italian marble equipped with Weston instruments.

The hoisting house is constructed of brick with reinforced concrete floors. The engine is 24 x 36 inches, first motion link reversing type with double 7 x 9-foot conical drums equipped with reverse weighted steam brake and dial indicator, and was built by the Vulcan Iron Works, Wilkes Barre, Pa.

The mine is ventilated by the latest improved Clifford-Capell reversible fan 18 x 8 feet, driven by a specially-designed 24 x 20 Phoenix direct-connected high-speed engine. A special feature in connection with the ventilating system is a circular air shaft 14 feet 6 inches in diameter driven through the strata, without timbers, and concrete. This shaft is drained by rings excavated below the water, which is conducted to a bore hole and thence to the surface and is used exclusively for ventilation, the air being split at the bottom in three divisions, each 80 feet in area. The capacity of the fan is 400,000 cubic feet of air per minute.

The Coke Plant.

At the present time there are 250 coke ovens in operation. These extend in two banks along the bottom of the hill and facing the reservoir. The ovens are of the usual bee-hive construction, the only notable feature being that they are 13 feet in diameter with a 46-inch door. One hundred and seventy-eight of the ovens were constructed with a view of being hand drawn, and have 32-inch doors, but the remaining ovens in the plant are designed to be machine drawn, and one Covington coke drawer is now in operation.

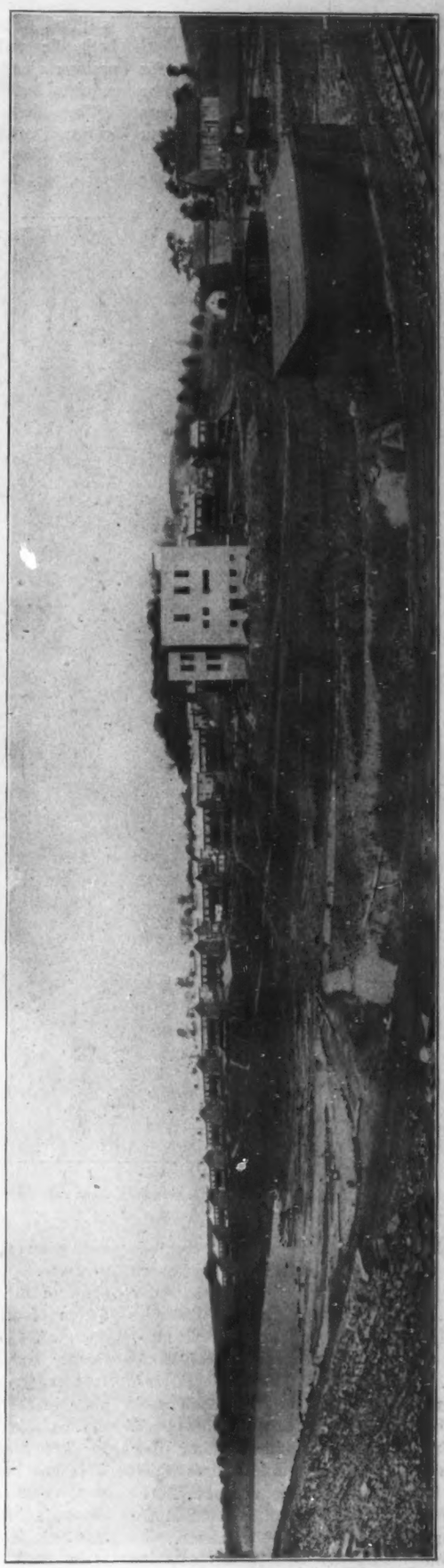
To eliminate the difficulties encountered by the older plants in the coke region upon the adoption of the machine coke drawers, cast iron jamb blocks laid on iron plates are being installed. This will prevent the jamb blocks being stripped or knocked out by the operation of the machine.

Aside from the 250 ovens in active operation, 176 new ovens are under construction, and it is estimated that the entire plant will be in operation within the next 60 or 90 days.

The water supply for the plant and mine is taken from the storage reservoirs with approximately 50,000,000 gallons capacity. Unlike the majority of the mining towns in the region, the town of the Taylor Coal & Coke Co. is not immediately adjacent to the operation but is located across the reservoir on the opposite hill, removed from the smoke of the ovens but still convenient to the operation. The town contains 150 modern houses with accommodation for about 200 families.

The Bourne-Fuller Co., of Cleveland, is sole sales agent for the output, and on Friday, June 7, the entire selling force of the company visited the plant and spent the day in viewing the operation.

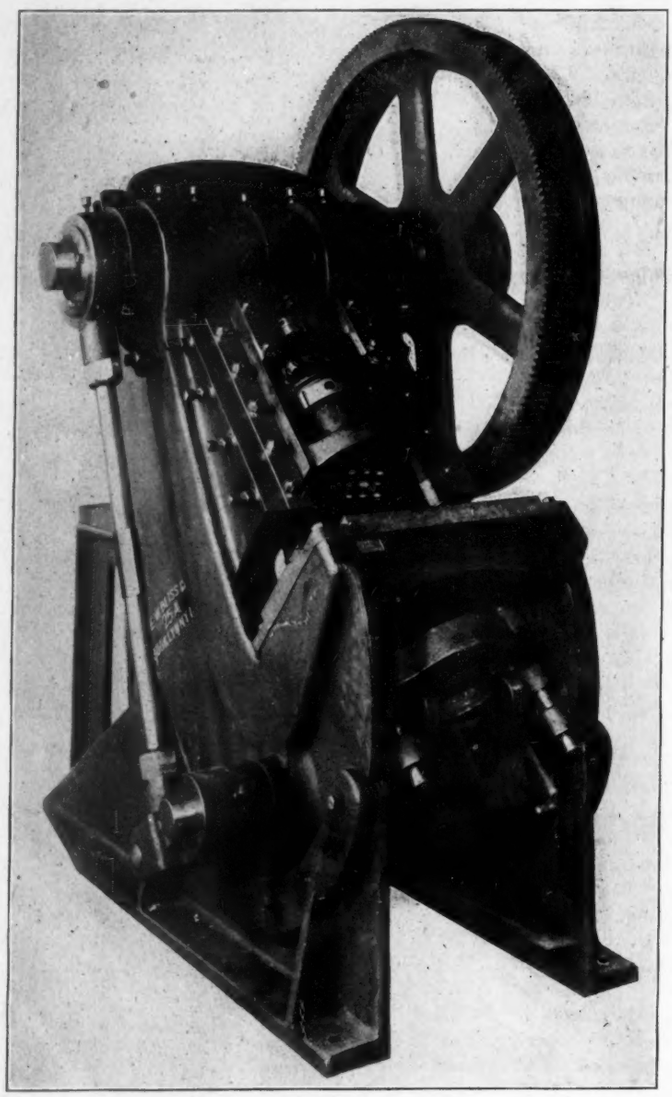
Mr. D. B. Stauft is general superintendent of the plant.



THE MINING TOWN; STORE BUILDING IN FRONT UNDER CONSTRUCTION.

"BLISS" ARMATURE CUTTING PRESS.

The demand for armature disks for motors and dynamos, together with the competition in this branch of business have been the means of bringing about many improvements in the machinery used in manufacturing them. In the standard types of motors, where competition is keenest, the armature disks are cut complete with notches and center hole, it being essential that the disks be produced in the most economical manner and with but a minimum of handling. To accomplish this, the E. W. Bliss Co., 8 Adams street, Brooklyn, N. Y., has built the special press illustrated.



BLISS PRESS FOR ARMATURE DISKS.

The machine is designed along new lines and embodies special features which are interesting. Springs used as knockouts are not positive, not to mention the amount of power which they absorb. To do away with the springs, this machine is fitted with positive knockouts for both die and punch which insures a positive ejection of the disk, and which requires but little power.

The slides are extra long and accurately fitted to give perfect guidance to the delicate dies to be operated in the press and it is connected with the shaft by two slide pitmans, which evenly distribute the pressure. There is a special adjustment in the mandrel for the accommodation of different heights of dies to be operated. The upper knockout is stationary and is between the two pitmans. It acts positively against the knockout plate in the mandrel which in turn acts against a knockout pin in the die, (holes for these pins are shown in the mandrel). This knockout has screw adjustment to compensate for any adjustment that may be made in the mandrel. The lower knockout is actuated by a crank on the main shaft which operates the knockout levers through the medium of a long connecting rod, which also serves to adjust the knockout plate. The knockout levers are connected with the lower shaft and raise the knockout plate on the up-stroke of slide sufficient to eject blank from die. The plate is accurately guided by two rods which keep it perfectly level insuring a uniform pressure upon the knockout pins in the lower die.

The inclined position of the press allows the disk after being ejected from lower die to fall out through the opening at the back of press while the upper knockout strips the scrap from the punch and enables the operator to rapidly feed another blank.

The machine is adapted for cutting disks complete with outside notches, center hole and key slot, up to 10½ inches diameter, or plain disks with center hole, up to 12 inches diameter. The press weighs about 5,000 pounds, and is direct driven by an electric motor fitted on the table at the back of the press.

THE 20-INCH STREIT PULLEY LATHE.

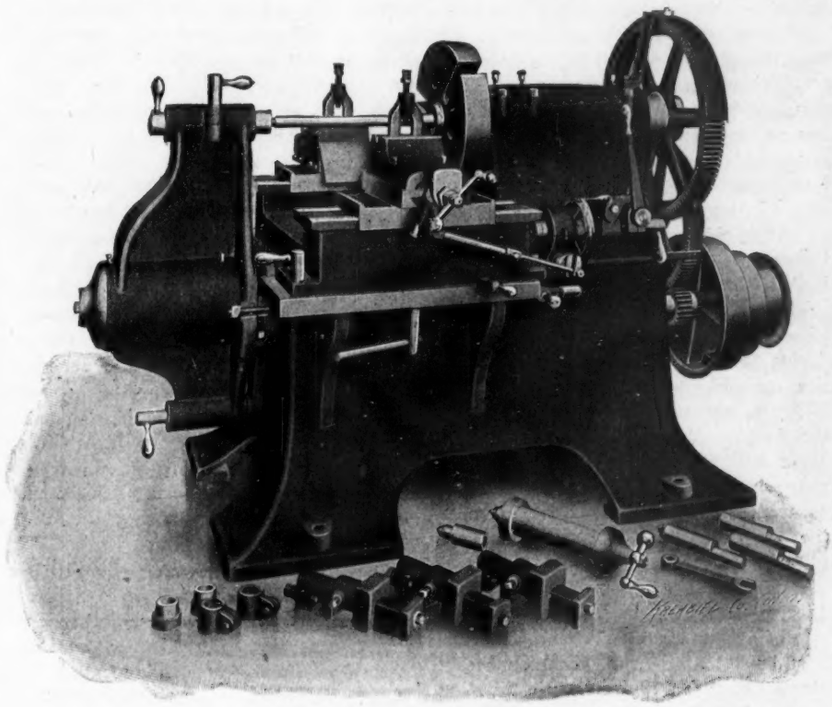
The accompanying illustration shows the 20-inch Streit pulley lathe, built by the Cincinnati Pulley Machinery Co., which builds the Streit line of pulley machinery. The machine is constructed so as to save as much time as possible in the handling of work and adjusting the machine.

The tool is particularly adapted for turning and facing pulleys, gears, flywheels, drums, couplings and work of a similar nature. It is furnished not only with a tail stock spindle for holding an arbor for turning pulleys, but is also furnished with a regular tail stock spindle, screw and centers, similar to an ordinary engine lathe. Power cross feed and a compound rest can also be provided, enabling any work to be performed on this machine which can be done on an ordinary engine lathe except chasing. The lathe will swing 21½ inches diameter and take 16 inches between centers when used as an engine lathe. However, if desired, the bed can be lengthened to take in longer work.

The table is swiveled in the center and one one side a series of holes is drilled so that each hole will give a different taper. This arrangement sets both tools at once for the proper crowning of pulleys. The tool rests travel simultaneously in opposite directions. The arbors are fitted in the spindle the same as the centers of engine lathe, and by using bushings of different diameters, pulleys with various-sized holes can be turned, thus eliminating the necessity of providing a large number of arbors. To hold

the bushing in place a split clamping collar is placed at each end of the hub of the pulley. The spindle is made of hammered crucible steel and is bored the entire length.

The tail stock is removable and may be swung out of the way when work is being placed in or removed from the machine. This feature, it is stated by the maker, is not to be found in any other pulley lathe. All gears are cut from the solid and have wide face and coarse pitch, and the pinions are all made from bar steel. The machine has a large range of feed changes, from fine to coarse, which can be made in a minimum of time. The feed mechanism is operated by a worm and worm wheel which is encased to afford protection from dirt. The capacity of the machine is pulleys of 20 inches diameter and 12 inches face.



THE STREIT 20-INCH PULLEY LATHE.

THE DAVIDSON AUTOMATIC DRILL CHUCK.

The accompanying illustrations show the Davidson automatic drill chuck manufactured by the Davidson Chuck & Machine Co., No. 524 West Sixtieth street, Chicago. The features of this chuck to which the maker called particular attention are as follows:

It has a positive non-slipping, non-marring, non-locking grip. It is accurately self centering and will readily accommodate any drill up to its maximum capacity. The chuck possesses no loose parts or keys which can be lost nor internal pieces to work out of place. In addition, it permits changing of drills without stopping the drill press, and eliminates entirely the item of wear, thus assuring the quality of the work by maintaining the accuracy of the jaws.

The basic principle of the device is indicated by the drawing, Fig. 2.

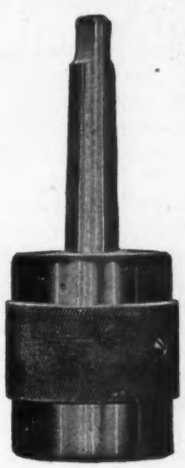


FIG. 1.—THE DAVIDSON DRILL CHUCK.

Four multiple sets of grip jaws, L., in cam form are constrained by a pin and slotted plate device to work in perfect harmony. A gentle spring action causes a constant tendency of the jaws to close, thus giving a light pressure upon the drill shank, C; when the latter is inserted the resistance offered by the work to be drilled causes and instant and proportionate response in tightening the jaws, L L. This tightening is done by rolling action, and eliminates all possibility or tendency to slippage.

The jaws are set accurately self centering for all sizes of drills, being assembled in a steel shell, A, set against grooves E on the interior and constrained to operate in unison. Any size shank to the largest drill within the capacity of the chuck is grasped and held positively and perfectly central. The jaws are released by means of a knurled sleeve outside of the shell. The movement to open the chuck is arranged to be opposite to the direction of the drill press spindle rotation. Thus, in order to remove or insert the drill, the operator opens the chuck by simply grasping the knurled sleeve. The spindle rotation immediately

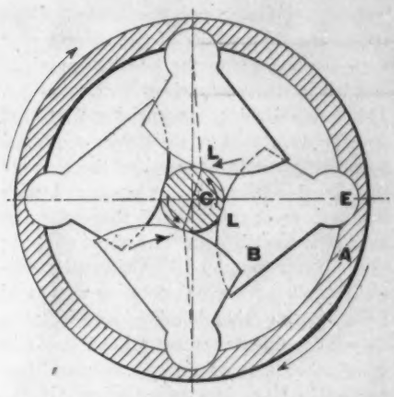


FIG. 2.—CROSS SECTION OF DAVIDSON DRILL CHUCK.

spreads the jaws, which close again lightly on a new drill shank, or empty, as soon as the knurled sleeve is released. This possibility of changing the drills quickly without stopping the machine will save considerable time daily. On work requiring a great number of changes during the day this chuck may add 30 to 60 minutes to the working time, or equivalent to 6 to 13 per cent of an eight hour day, or 150 to 312 hours per year. The range of capacity of the chuck is not by steps; that is, no more than one size of chuck is required for all the drills within the range of the machine. The range of the drill size is from zero up to the capacity of the chuck.

Chucking being effected by rolling action, there is no wear on the jaw faces, or cutting of drill shanks.

GRATIFYING RESULTS

Of a Tabulation of Sales of Machine Tools.—Optimism is Not Universal.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St.,
New York, Aug. 5.

Figures full of significance as indicating the trend of conditions in the machine tool trade have been prepared by a leading house of this city, with most encouraging results. This concern acts as eastern agent for a representative western manufacturing concern with a varied line of output. During the week a letter was received from the manufacturer, who intimated that he thought a moderate recession might be expected during the fall, to continue through the next presidential compaign, and suggested a curtailment of the large orders for stock which the dealer had placed with him, in some instances for very advanced delivery. The selling house had felt no effects of the much-discussed recession, but to make certain that its sales sheets confirmed its roseate view of the situation, tabulated its sales of this manufacturer's machines since the first of 1906, comparing the months of the current year with the same months of that previous and basing the comparison on cost prices. This established the surprising fact that the seven months of this year averaged about 40 per cent better than the average for all of 1906, while as compared with the first seven months of that year the gain was much heavier, about 67 per cent. Not a month of 1907 showed smaller sales than the corresponding month of 1906; on the other hand, in one instance the 1905 figures were tripled and in three other months they were more than doubled. Most interesting of all is the disclosure that, while May was the lightest month of the current year, there has been a steady increase since, July being almost up to the average, whereas in 1906 it was the lightest of the year. In view of these conditions, there will be no cancellation of orders for stock.

This optimistic view of the future is by no means universally held, but prevails among many who are in good position to judge. There are occasional reports of cancellations, and in some instances these have been of considerable size, but their effect has not been felt in the volume of new business and orders already booked. Pneumatic tools are in somewhat lighter demand, according to one important concern, which finds, however, that July was the heaviest month of the year and that so far orders have totalled better than a year ago. Random orders for individual machines, with occasionally a small plant equipment, are making up current business, but in the aggregate are proving very satisfactory. No other railway lists are to be discovered, though contracts for the erection of shops have been let by the Central of Georgia at Macon and the Baltimore & Ohio near Washington. The Seaboard Air Line is pushing work on its Jacksonville shops and considerable inquiry is expected from these sources shortly.

Although no effort is being made to push the membership list of the Machinery Club of New York during the vacation season, a total of 331 applications has so far been received. Distant cities are contributing liberally. San Francisco, New Orleans, Memphis, Havana and the City of Mexico are already represented. Cincinnati has sent in ten applications, Chicago fourteen, Cleveland thirteen and Philadelphia twenty.

The Vandyck-Churchill Co., 91-93 Liberty street, New York, has been able during the past week to occupy the entire ground floor at these numbers. Hitherto the uncompleted condition of the building allowed the use of only about half of the street frontage. The new show room contains about 5,000 square feet and is one of the finest in the east for the display of machine tools.

Batcheller, Clarke & Batcheller, 107 Liberty street, New York, report the sale of a 4-ton hand rack crane with electrict hoist to the A. S. Cameron Steam Pump Co. and a 10-ton electric traveling crane with 27-foot hoist to S. P. Pearson & Co., New York.

Wise & Bailey, belting manufacturers at 108 Walnut street, Philadelphia, have taken title to adjoining property, No. 110-12, as a site for a new factory and office building. This, it is expected, will be ready for occupancy by the first of next year.

The Wetherill Finished Casting Co., Philadelphia, has let the contract for a machine shop and foundry, 85 x 125 feet, of brick construction, at the corner of Richmond street and Erie avenue. A two-story office building, 38 x 62 feet, will also be erected.

The Earle Gear & Machine Co., 141 Oxford street, Philadelphia, has awarded to the Concrete Engineering & Supply Co. the contract for the erection of a two-story machine shop, 70 x 138 feet, of concrete construction, faced with brick. A 10-ton traveling crane with a 23-foot span will be installed. The new plant will be located at the corner of Stenton avenue and Louden street, Chestnut Hill.

Contracts are shortly to be announced for the construction of two additional buildings for the Victor Talking Machine Co., Camden, N. J. One is to be 92 x 174 feet, one story and basement, with provision for five additional stories later. The other will be 80 x 173 feet, six stories. Both buildings will be of brick and stone to match the present plant. Bids from a select list of contractors close Aug. 7.

AMONG NEW ENGLAND INDUSTRIES.

Worcester, Mass., Aug. 5.—The American Steel & Wire Co. is to erect a new steel rod mill, costing from $50,000 to $60,000. It will be 264 x 140 feet, built of steel and brick. At the same time alterations on another building will be begun, for a paper saturating mill. The change will cost about $14,000, and the building will be 90 x 38 feet.

The stockholders of the American & British Mfg. Co., makers of artillery, ammunition and lathes, Bridgeport, Conn., have voted to reduce the common stock of the concern from $8,000,000 to $2,000,000. New certificates will be issued to present common stock holders in proportion of one new stock share for four old stock shares. Non-interest bearing scrip will be issued for the fractional share to which holders may be entitled.

The power for operating the plants of the Benedict & Burnham Mfg. Co. and the Holmes, Booth & Hayden Co., two of the large branches of the American Brass Co., and located in Waterbury, Conn., will be supplied from a single boiler plant in the near future. This will effect a saving in power expenses, especially in the element of labor.

Wilcox, Crittenden & Co., Middletown, Conn., manufacturers of maritime hardware, whose plant was burned July 31, will rebuild. One serious loss in connection with the fire was the destruction of valuable drawings and patterns.

The stockholders of the Lamb Knitting Machine Co., Chicopee Falls, Mass., at their annual meeting elected the following officers: Directors, Robert Russell, of Holyoke; Dr. Joseph T. Herrick, of Hyannisport; J. L. Hallet, of Hyannisport; H. P. Morris, of Springfield; and F. D. Howard, of Chicopee Falls. President, Robert Russell; vice president, Joseph T. Herrick; secretary and treasurer, L. I. Howard; auditor, Charles J. Seaver.

The Cunningham Iron Co., Boston, had its plant destroyed by fire Aug. 1. The factory was a two-story frame building 75 x 100 feet, with a tower. The company owned its plant and the loss is about $100,000.

The National Association of Stationary Engineers will hold its annual convention at Niagara Falls the second week in September.

GOVERNMENT SHOPS

On the Pacific are Busy—News Notes from the Pacific Coast.

(Special Correspondence.)

Seattle, Wash., July 31, 1907.—Some slight improvement in the Pacific coast coal situation is assured by the announcement that the Oregon & Washington railroad, the local name for the Harriman line now under construction between Portland and Seattle, will commence active work immediately on the six-mile branch from Centralia up Hannaford creek to the coal property of the Washington Union Coal Co. This company, also a subsidiary Harriman corporation, owns several thousand acres of coal land on Hannaford creek which it has been developing since Jan. 1; it is now announced that the mine will be ready to ship coal out in ninety days. The fuel is of good quality and adaptable for coking. While the output of the new field will by no means be able to fill the present deficiency in supply, it will help appreciably in relieving a shortage that even now, in midsummer, is acute.

Capt. Benjamin Havner, who will be manager of the Hall Bros. Marine Railway & Ship Building Co., at Winslow, Kitsap county, Wash., after Aug. 1, announces that hereafter the firm will devote considerable attention to steel ship building and to the construction of marine engines and boilers. Heretofore the yard has constructed wooden vessels almost exclusively. Extensive improvements are being made in the machine shop and forge shop preparatory to engaging in the new work. A 40-foot shaft lathe with 26-inch swing, a 10-foot radial drill, heavy Hilles & Jones shears with a 5-foot gap and punch with a capacity of 1½-inch hole through 1½-inch plate have been installed in the machine shop. Other improvements are being planned.

W. J. C. Bartell, president of the Bartell Tin Mining Co., has recently returned from New York, where he purchased a new stamp mill and other machinery for his extensive tin mines that are being developed at Tin City, Alaska. Mr. Bartell thinks that the development of Alaska has scarcely begun, and that each successive season will witness larger demand for machinery of all sorts for use in aiding the many development projects now under way in the northern territory.

The new plant of the National Foundry Co. at Tacoma, Wash., is practically completed and is expected to begin running soon after Aug. 1. The foundry is a 60 by 80-foot frame building, containing a 42-inch cupola. W. J. Davis is president of the company, which is incorporated in Washington for $25,000.

The Puget Sound Iron Works, J. B. Baddenhausen, president, are receiving many orders for the new line of Baddenhausen water-tube boilers that they are manufacturing and announce that their new plant now under construction at Richmond Beach, ten miles north of Seattle, will be devoted almost exclusively to the manufacture of these boilers. Excepting logging engines, this will be the first firm on the north coast to devote a plant entirely to the manufacture of any one line of heavy machinery.

With one exception the usual midsummer dullness is being experienced by the foundries and machine shops operating on Puget sound. This exception is the works of the government at the navy yard, Puget sound. The yard has been unusually busy all summer preparing the Nebraska for service and refitting the Wisconsin and the full force of 600 to 700 men has been continually employed. It is also noted that in anticipation of the arrival of the heavy battleship fleet on the Pacific, the Puget Sound yard is unusually active and expects to be so for many months to come.

A new foundry doing a general jobbing business expects to begin operations in Tacoma Aug. 1. The new firm will be known as the National Foundry Co., and has been incorporated for $25,000; the officers are, W. J. Davis, president; W. J. Meyer, secretary and manager, and John Chapman, treasurer. Mr. Davis states that the plant will consist of a 60 by 80-foot shop with a 42-inch cupola, situated on a lot 146 by 250 feet near the Northern Pacific tracks in South Tacoma.

The Elliot Bay Iron Works of Seattle, J. B. Baddenhausen, president, has purchased ten acres of land on tide water at Richmond Beach, ten miles north of Seattle, on which it will erect its new plant consisting of a foundry, machine shop, and boiler shop. The new works will be electric-driven from a 300-horsepower central station. Construction has already commenced and the plant is expected to be running by Oct. 1.

The Kawaski Dockyard Co., of Kobe, Japan, has recently completed a new Siemens-Martin steel plant; the capacity of one charge is ten tons. The plant makes its own gas, is electrically operated and is now prepared to make steel castings up to ten tons each.

The Panama Portland Cement & Development Co., which was recently incorporated for $1,000,000 to erect a cement works within easy shipping distance of the isthmus, has secured an extensive site in Alabama on the Tombigbee river. Cement-making machinery with a capacity of 1,000 barrels daily is to be purchased shortly. C. C. Godfrey, secretary of the company, can be reached at Batavia, N. Y.

LONG PIPE LINE

To be Built by Railroad to Secure Oil for Fuel.—San Francisco News.

(Special Correspondence.)

San Francisco, Aug. 3.—The directors of the Southern Pacific Co. have definitely decided to build an oil pipe line from the oil wells of the company in Kern county, via Delano, to a point near Port Costa on the Bay of San Francisco, at an estimated cost of $6,000,000. The company, after experimenting for several years, has come to the conclusion that oil is to take the place of coal as the future fuel to run its locomotives. It will also make the Port Costa terminal of the pipe line a principal distributing point, because it will be the most accessible point for cars and deep-sea vessels. The officials of the company figure that they will be able to distribute the oil very much cheaper than it can be done at present, by hauling many tank cars filled from the wells a distance of 250 miles, to the center of distribution, and then haul the empty tank cars back again to the wells to be refilled. The new pipe line will be fully 250 miles in length, and is to be completed within two years. The contract for the ditch for the pipe has been let. It amounts to $1,500,000. The boilers will be built by a San Francisco firm, while the work for the pumps has been awarded to a Los Angeles concern. There will be 23 pumping stations along the line.

The project of bringing fuel oil close to San Francisco, and being able to distribute a supply about the bay, will have a vast influence in increasing all sorts of industries in California. The state, though containing millions of barrels of crude oil, has suffered from lack of cheap fuel because the oil was too far from the manufacturing centers, and the cost of transportation made it as high-priced as coal. There are immense quantities of coal along the northern coast, but coal is high in San Francisco. The same may be said of crude oil, which is worth very little at the wells, but is held at a high rate at manufacturing centers.

The site occupied by W. A. Boole & Sons as a ship yard is about to pass into the possession of the Western Pacific railway interests. The site consists of 13 acres fronting on the Oakland estuary, and is considered an admirable location for the terminal of the new competing road, which will bring rail and ship together. The consideration is said to be $650,000.

The contractors are endeavoring to reach an agreement with the Building Trades Council by which a permanent wage scale shall be established, assuring industrial peace for three years. Meetings to that end have been held but, thus far, without result.

COAL LITIGATION

Between Dominion Iron & Steel and Dominion Coal Co.'s Comes to Trial—Canadian News.

(Special Correspondence.)

Toronto, Aug. 4.—The trial of the action for damages brought by the Dominion Iron & Steel Co. against the Dominion Coal Co. for breach of contract to supply coal, involving many million dollars, was commenced at Sydney, N. S., on July 30, before Judge Longley. W. B. A. Ritchie, K. C., opened the case for the steel company, explaining the contract between the companies and emphasizing the stipulations as to the quality of coal to be furnished. He said it would be proved that the article supplied was not coal in a commercial sense and could not be used. The difficulty between the companies occurred in August, September and October last year, when the steel company complained not only of the quality but of shortage in quantity, owing to which coal had to be procured from outside at an increased price and preventing the works from running at their accustomed capacity. The main issue was whether the steel company was justified in refusing the coal, and if so, if the coal company was justified in breaking the contract.

The Grand Trunk Railway announces that it will have ready in September for fall traffic $7,000,000 of rolling stock, which has been under construction for some time. This includes 4,500 freight cars, 30 passenger coaches and 60 locomotives.

Dr. A. P. Coleman has reported to the Ontario department of mines respecting the iron ranges in the vicinity of Red Paint river lying east of Lake Nipegon, on the exploration of which he has been for some time engaged. He regards them as decidedly promising. R. H. Flaherty is prospecting portions of the range with a diamond drill and the results have been satisfactory. Dr. Coleman has found a small body of good hematite ore near the eastern end of the range. If developed the deposits will be tributary to Port Arthur and Fort William.

The Fort William Iron Works, owned by Stenhouse Bros., has secured the Canadian agency for manufacturing the iron work of the Benson lumber cart as made by the A. W. Benson Co. of Minneapolis, and has a number under construction.

The Canadian Northern Railway Co. has taken out building permits for the construction of railway shops in Fort Rouge, near Winnipeg, to cost $200,000.

A charter has been given J. J. Herbert, Wm. E. Short, Harold V. Shaw, and others, for the Canadian Railway and Contractors' Supply Co., Ltd., of Montreal, with an authorized capital of $100,000.

MOODY'S INDUSTRIAL MANUAL FOR 1907.

The eighth annual edition of Moody's Manual of Railroads and Corporation Securities for 1907 has made its appearance. The edition covers in a broad way the four great departments of American corporate enterprise and industry, namely, steam railroads, public utilities, industrials, miscellaneous corporations and mining enterprises. There are almost 3,000 pages in the book devoted to furnishing uniform and complete information regarding practically all undertakings in each of these fields, and covering not only the United States, but Canada and Mexico, besides treating of important enterprises of interest to Americans in Cuba and South America. With the reports of banks and financial institutions the manual reports facts on over 20,000 distinct corporations, including 1,512 active operating railroad corporations, 1,100 electric traction companies, 1,130 gas, electric light and power companies, 267 water supply companies, 259 telephone, telegraph and cable companies, 1,510 active, operating and producing industrial and commercial corporations, and 880 active or operating mining companies. Annual statistics are also given regarding more than 13,500 banking industries and other financial companies. The book has been planned for quick reference. Each statement contains the date of incorporation of the company, its location, a description of its property and its business, facts regarding its capitalization, dividends paid etc., full description of all bond issues and mortgages, income accounts, balance sheets, wherever obtainable, names of officers and directors with addresses and other useful data. The information relative to the leading railroad systems is supplemented by maps showing the lines operated. The manual is published by the Moody Corporation, 35 Nassau street, New York, and is furnished at the price of $10 in cloth and $12 in leather.

The Central of Georgia Railway Co. has awarded the contract to the McKenzie-De Leon Construction Co., Savannah, Ga., for the erection of shop buildings at Macon, Ga.

AMONG THE INDUSTRIES OF INDIANA.

(Special Correspondence.)

Indianapolis, Ind., Aug. 5.—The Portland Foundry and Machine Co. has been organized with a capital of $25,000 at Portland, Ind. to succeed to the business of Sixbey and Grumme, manufacturers of oil well supplies and general machinery. The officers of the company are: J. A. Long, president; William A. Fields, vice-president; Frederick Grumme, secretary and L. G. Holmes, treasurer. The directors include John Easterday, and George H. Smith in addition to the officers. The new company will make extensive improvements.

Bids will be asked within a short time by the Himes Mfg. Co., Portland, Ind., for the erection and equipment of a new plant. The company, which was recently incorporated, will manufacture metal and wooden derricks and gas and oil drilling supplies. John S. Himes is president.

A new plant is being built for the Overland Automobile Co. in this city and the contracts call for its completion within six weeks. President D. A. Parry of the Parry Mfg. Co., buggy manufacturer, is at the head of the automobile company. New machinery will be installed and the plant will be modern in every particular.

Through a petition filed with the secretary of state, the corporate life of the Anderson Foundry & Machine Works, Anderson, Ind. has been extended fifty years. W. T. Durbin, ex-governor, is president of the company and W. N. Durbin, secretary.

Luee & Gidley of Laporte have been awarded a contract to construct a large ditch through Porter and Lake counties and are in the market for machinery and ditching equipment with which to carry out the contract. The ditch will be forty feet wide and several miles long and is one of the largest ditch contracts ever let in northern Indiana.

The Indianapolis Corrugating Co. has been organized and incorporated in this city and will manufacture articles of iron and steel in combination with cement, asbestos, wood, asphalt and paper. The capital stock is $100,000, which is invested by J. Q. A. McClurg, F. M. Bowers, T. A. Bowers, John Lauck and W. E. Hackedorn.

The Lunkenheimer Co., of Cincinnati, gave its annual picnic to its employes at White Water park on Saturday, July 27. About 3,000 people attended.

Movement of Securities is Restrained

A pressure of restraint appears to be upon the stock market, and developments of the past week have shown this condition quite clearly. Prices have been wholly unresponsive to the favorable factors added to the situation, particularly the earning record presented by the quarterly report of the United States Steel Corporation, and the increase in the Southern Pacific dividend rate from 5 to 6 per cent. In fact, Steel Corporation stocks and bonds all showed declines over the previous week. Traders put much more emphasis upon the Steel Corporation's statement that new orders for July had fallen off against the same month of last year, than the strong display of earning capacity exhibited for the past quarter. Generally the doubtful condition in security lines is attributed to the stringency that prevails in the money markets, both at home and abroad. The foreign situation caused in the week a gold export movement of $500,000 to Paris, but later the rate adjusted itself so that there was an inflow of foreign capital for loan purposes in this country. Time money has become firmer, the average rate of the week for 60 day loans, New York, being 4¾ per cent, against the same figure last week, and 4 per cent last year. Call funds are sufficient, however, to meet all demands, ruling in the week at the rate of 2½ per cent, against 3 per cent last week, and 2½ per cent last year. Declines in prices were general in the period under review, and in some cases these were of rather sharp proportions. The activity on the exchange was at a minimum. Saturday's sales of 71,500 shares were the second lowest of any Saturday of the year, the record being July 22, when in a short session the total was 65,600 shares. Little buying was done outside of professional circles. The total transactions on the New York exchange in the week were 2,396,202 shares, against 3,078,150 shares in the previous week, and 5,517,140 shares the same week of 1906. Bonds were also less active, the total sales, exclusive of government bonds, aggregating $4,064,000, against $5,422,000 the previous week, and $8,242,000 last year. The New York bank statement was unsatisfactory, the cash holdings decreasing $903,100, cutting the surplus reserve $1,785,475. The to al surplus reserve at the week's end stood at $7,473,200, against $14,122,675 the corresponding date of 1906. An increase of $3,529,500 was shown in deposits, but loans expanded $3,787,000.

Copper Stocks.

Boston.—Butte Coalition, closed 23; Calumet & Arizona, closed 160, net loss in week 7; Green-Cananea, closed 15⅛, net loss ½; North Butte Mining, closed 77¼, net loss 4¾; Osceola Mining, closed 124, net loss 4; Quincy Mining, closed 112½.

New York.—Amalgamted Copper, closed 84¾, net loss 5⅞.

Henry & West, Philadelphia, announce the purchase from the Spanish-American Iron Co., all of whose stock is owned by the Pennsylvania Steel Co., of $1,000,000 first mortgage sinking fund 6 per cent bonds, dated July 1, 1907, and due July 1, 1927. These are part of an authorized issue of $5,000,000, which will be used to develop iron ore resources in Cuba. The bonds are guaranteed by endorsement by the Pennsylvania Steel Co.

Recent dividend declarations include the following: United States Steel Corporation, regular quarterly dividend of 1¾ per cent on the preferred stock, payable Aug. 30, and ½ of 1 per cent on the common stock, payable Sept. 30; Jefferson & Clearfield Coal & Iron Co., regular semi-annual dividend of 2½ per cent on the preferred stock, payable Aug. 15; American Ship Building Co., regular dividend of 4 per cent. payable 1 per cent Sept. 2, Dec. 2, March 2 and June and an extra dividend of 2 per cent on the common stock; the American Radiator Co., regular quarterly dividend of 1¾ per cent on the preferred stock, payable Aug. 15, and 1 per cent on the common stock, payable Sept. 30.

THE LEADING INDUSTRIAL SECURITIES.

	Clos'ng Quo. Aug. 3	Changes in Week	Date 1907 Ann. M't'g	Stock Outstanding	Dividend Basis	Dividend Last Paid	Dividend Date Last Div. Pay.
Allis-Chalmers	9⅛	− ¾	Sept. 5	19,820.000		.....	.....
Allis-Chalmers pr	27	.....		16,150.000	7 cum	.....	Feb., 1904
American Can	5¼	− ⅛	Feb. 7	41.233.300		.....	.....
Am. Can pr	52½	− ¾		41,233,300	7 cum	5 Q.	Apr., 1907
Am. Car and Fdy	42¾	−1⅛	June 27	30,000,000		2 Q.	Apr., 1907
Am. Car and Fdy pr	101	+1		30,000,000	7 n. c.	7 Q.	Apr., 1907
American Loc	57	−2¼	Oct. 5	25,000.000		1¾ Q.	May, 1907
American Loc. pr	106⅛	+ ¼		24,100,000	7 cum	1¾ Q.	July, 1907
American Ship	71	−1	Oct. 2	7,600,000	6	1 Q.	June, 1907
American Ship pr	103½	.....		7,900,000	7 n. c.	1¾ Q.	Jan., 1907
Am. Steel Foundries	7	− ⅛	Oct. 1	15,810,000		.....	.....
Am. Steel Foundries pr.	40	+1		17,240,000	6 cum	.....	Aug., 1904
Barney & Smith	65	.....	June 4	2,000,000	4	1 Q.	June, 1907
Barney & Smith pr	128½	.....		2,500 000	8 cum	2 Q.	June, 1907
Bethlehem Steel	13	.....	April 2	14.862,000		.....	.....
Bethlehem Steel pr	40	.....		14,90⁸,000	7 n. c.	1¾ Q.	May, 1907
Cambria Steel	35⅝	− ⅜	March 19	45,000,000*	6	3 Q.	Feb., 1907
Cambria Iron	46	.....		8,468.000*	4	4 S. A.	Apr., 1907
Chicago Pneumatic Tool	39	−1	Feb. 18	6,145 800	4	1 Q.	July, 1907
Colorado Fuel	29⅞	−3¼	Oct. 21	30,132,000		.....	Apr., 1902
Crucible Steel	8½	.....	Oct. 16	24,578 400		.....	.....
Crucible Steel pr	68¾	− ¾		24,436.500	7 cum	6	Mar., 1907
Empire Steel	8	.....	Feb. 27	2.281,400		.....	.....
Empire Steel pr	59	+2		2,500,000	6 cum	3 S. A.	July, 1906
Fay & Egan	100	.....	Feb. 19	1.000,000	6	1¾ Q.	May, 1907
Fay & Egan pr	128½	.....		1.000.000	7 cum	1¾ Q.	May, 1907
General Electric	137	−2	May 14	63.643.600	8	2 Q.	July, 1907
Harbison-Walker	13½	.....	Jan. 21	18,000,000	6	.....	.....
Harbison-Walker pr	72¾	.....		9.000,000	6 cum	1½ Q.	July, 1907
International Pump	26	+1	June 4	17,762,500		2	Apr., 1905
International Pump pr	75½	+2¾		11,350,000	6 cum	1½ Q.	Aug., 1907
Lackawanna Steel	52	.....	March 13	34,971.400		.....	.....
Lake Sup. Corp.	8	.....	Oct. 2	40,000 000		.....	.....
New York Air Brake	122⅜	−1	June 18	10,000.000	8	2 Q.	Apr., 1907
Niles-Bement-Pond	130	.....	Feb. 6	5,000,000	6	6 Q.	Mar., 1907
Niles-Bement-Pond pr	105	.....		2,000,000	6 cum	2 Q.	May, 1907
Otis Elevator Co	35	.....	March 18	6,350 300		3 A.	Apr., 1907
Otis Elevator Co. pr,	89	.....		6,308 500	6 n. c.	1½ Q.	July, 1907
Penn. Steel	60	.....	May 13	10.750 000		.....	.....
Penn. Steel pr	100	.....		15,500 000	7 n. c.	3½ S. A.	May, 1907
Pittsburg Coal Co	10⅜	−1⅛	Feb. 11	32 000.000		.....	Nov., 1906
Pittsburg Coal pr	51⅓	−2⅜		32,000.000	7	.....	Apr ,1905
Pressed Stl. Car	33⅜	−1⅝	Feb. 20	12.500,000		3	Aug., 1904
Pressed Stl. Car pr	91	− ½		12.500 000	7 n. c.	1¾ Q.	May, 1907
Pullman	162½	− ⅝	Oct. 17	100.000 000	8	2 Q.	May, 1907
Railway Stl. Spring	41¼	−1	March 7	13 500.000		4 S. A.	Mar., 1907
Railway Stl. Spring pr	90⅜	+1⅜		13,500.000	7 cum	1¾ Q.	June, 1907
Rep. Iron & Steel	26¾	−1¾	Oct. 9	27.191,000		.....	.....
Rep. Iron & Steel pr	82½	−1½		20,416 ⁴00	7 cum	1¾ Q.	July, 1907
Sloss-Sheffield	55	−2	March 5	10,000,000	6	3 Q.	June, 1907
Sloss-Sheffield pr	95	− ½		6.700,000	7 n. c.	1¾ Q.	July, 1907
Tenn. Coal & Iron	140	−3	May 7	22.553 060	4	1 Q.	Aug., 1907
U. S. Pipe & Fdy	36	+ ⅛	June 26	12,50⁰.000	4	1 Q.	June, 1907
U. S. Pipe & Fdy. pr	81⅛	− ⅝		12 500 000	7 n. c.	1¾ Q.	June 1907
U. S. Steel	35½	−2⅛	April 15	508,302 500	2 n. c.	½ Q.	July, 1907
U. S. Steel pr	100⅜	− ⅜		360,281 ⁴00	7 cum	1¾ Q.	June, 1907
U. S. Steel 5's	97	− ⅛		463,798 000	5	5 A.	.....
Va. Iron, Coal & Coke	68	+6	Sept. 17	8,641,660		.....	.....
Westinghouse Elec	144½	− ½	July 24	24 998.700*	10	10 Q.	Apr., 1907
Westinghouse Air Brake	148	.....	Oct. 1	11,000,000*		22½ Q.	Jan., 1907

Par value of shares, $100, except those starred (*), $50.

NEWS FROM MANY INDUSTRIES

New Buyers:—

The Falfurrias Machine Shops, Falfurrias, Tex., capital $10.000 has been chartered by E. C. Lasater, Lawrence D. Miller and M. A. Newman.

With a capital of $5,000 the Viking Shear Co., Erie, Pa., has been chartered by H. Parker Weller, W. G. Butler, H. L. Walker, E. E. Walker and Henry E. Fish.

The Fay Machine Tool Co., Cincinnatti, has filed articles of incorporation. Those interested are: Otto W. Schaum, R. C. Fay and George W. B. Fletcher.

The Whitney Metal Punch Co., Rockford, Ill., has been chartered with an authorized capitalization of $30,000 by Wilbur L. Keeney, Frank Vander Bogart and C. G. Ballentine.

L. G. Holmes, J. A. Long, G. H. Smith, W. A. Fields and J. G. Easterday have incorporated the Portland Foundry & Machine Co., Portland, Ore., with a capital of $25,000.

The Air Pump & Meter Co., Bradford, Pa., capital $110,000, has been formed by Edwin E. Tait, R. J. Hoffman, E. H. Hollingshead, E. J. Jones and B. J. Straight, all of the addresses given above.

The West Side Foundry Co., Troy, N. Y. has been organized by William Sleicher, William N. Sleicher and Charles A. Sleicher with a capital of $100,000 to manufacture iron and metal castings.

The Crawford Locomotive & Car Co., Streator, Ill., has been organized by R. W. Crawford, Alberta Brown and P. J. Lucey, with a capital of $500,000 to manufacture railway rolling stock and equipment.

Norton J. Newth, Leslie E. Hollister, Clarence B. Garlock and others have organized the N. J. Newth Hardware Co., Ilion, N. Y., with a capital of $20,000. The new company will manufacture hardware and hardware supplies.

The Engineers' Supplies & Brass Foundry Co., South Bend, Ind., has filed articles of incorporation with a capital of $25,000. The directors are: C. T. White, E. P. Baum, S. A. Knobleck, E. J. Clark and C. M. Krieghbaum.

The Ives & Hoffer Co., Philadelphia, has been formed with a capital of $20,000 to manufacture iron and steel products. The directors are: Allen R. Hoffer, Landsdowne; George A. Maene and Elbert Williamson, Philadelphia.

The O. K. Harry Steel Co., St. Louis, has been organized by Charles M. Hammel, Lily B. Nelson and French L. Nelson to manufacture and deal in iron, steel, copper, etc., with a capital of $40,000. Address 2333 Papin street.

The Hammock Steel Range Co., Knoxville, Tenn., has been chartered with an authorized capitalization of $300,000 by G. C. Childress, E. J. Wooten, W. M. King, T. J. Hinton and others.

The Peavey Foundry Co., Inc., Lowell, Mass., has been organized with a capital of $40,000. The officers of the company are: President, Franklin S. Peavey; treasurer, James A. Peavey; clerk, Julia T. Peavey, all of Lowell.

The No-Say-Wire Fence Co., New York, capital $250,000 has been formed by William R. Dodge, Abram W. Naar, Charles Dickson and William H. Dodge, 27 William street, New York. The company will manufacture wire fences and wire goods.

The D. L. Baker Machine Co., Wellsville, N. Y., has been incorporated to manufacture agricultural implements. The capital stock of the company is $20,000, and the incorporators are: Daniel L. Baker and Daniel H. Fuller, Scio, N. Y., and Charles M. Pollack, Wellsville, N. Y.

The Hewitt Motor Truck Co., New York, has been incorporated to manufacture motor trucks, motor omnibuses, etc., with a capital of $300,000. Those interested in the new company are: Edward R. Hewitt, F. E. Alden, 6 East Thirty-first street; R. F. Masury, 44 West Twenty-fifth street, all of New York.

Articles of incorporation have been filed by the Perco Regulator Co., New York, to manufacture devices for combustion and utilization of fuel. The capital stock of the company is $30,000, and the incorporators are: William W. Chadbourne, Charles E. Otis and J. Robert Rubin, 24 Broad street, New York

The Strand Heater Co., Cleveland, has been organized with a capital of $10,000 by Henry Strand, J. A. Freund, J. G. Reyant, L. D. Greenfield and A. M. Freund to place a patent heater and similar products upon the market. The plans of the company have not yet fully matured.

The Railway Safety Appliance Co., Hoboken, N. J., has been chartered by J. F. Rogers, 4 New Chambers street; P. J. Streeter, 43 West 130th street, both of New York, and E. D. Thomas, 955 Bostwick avenue, Brooklyn, to manufacture railway safety appliances. The capital stock of the company is $150,000.

The Blackburn Delineator Co., New York, to manufacture machinery, tools, etc., traction drawings, patterns, designs and charts, capital $50,000, has been chartered by J. Wellington Hoyer, 229 Macon street, Brooklyn; Richard H. Blackburn, 58 East Twenty-fifth street, and William T. Brown, 52 Broadway, both of New York.

Articles of incorporation have been filed by the Pneu "L" Electric Co., New York, to manufacture horseless vehicles, motors, engines, etc. The capital stock of the company is $200,000, and the incorporators are: Walter C. Burton, 396 Seventh avenue, Brooklyn; George Leveene, Yonkers, N. Y., and Francis Fitch, 42 Broadway, New York.

The R. W. Speed Variator Co., New York, capital $300,000, has been organized by John T. Condon, 68 William street; B. B. Coyne, 29 Broadway; W. C. Lawson, 1 Broadway, all of New York; F. D. Peale, Summit, N. J. and F. X. Carmody, 762 Westminster road, Brooklyn. The company will manufacture machinery for construction of R. W. Speed variators, etc.

New Construction:—

The Illinois Corrugated Metal Co., Bloomington, Ill., is erecting an addition to its plant.

The Enterprise Mfg. Co., Columbiana, O., is preparing to erect a substantial brick addition to its plant, which will be used as a machine shop.

The Hoag Rapid Press Co., Hartford, Conn., has begun work upon the erection of a three-story and basement machine shop 60 x 150 feet, of concrete construction.

The Buckeye Steel Castings Co., Columbus, O., has purchased an acre in the immediate proximity of its plant, and will erect a modern and commodious office building on the ground.

The Nortmann-Duffke Foundry Co., Milwaukee, has purchased another tract adjoining its plant in Layton Park, at the southwestern limits of the city, for extensions of its works. An addition 40 x 100 feet to the pressed steel tank department has just been completed.

The General Compressed Air & Vacuum Machinery Co., 4436-4438 Olive street, St. Louis, has increased its capital stock from $120,000 to $750,000. A new modern plant, which will cover an acre of ground space, is planned to be erected on Jefferson avenue, between Lafayette and Geyer avenues.

George B. Limbert & Co., 51 Fulton street, Chicago, manufacturers of steam-fitters' supplies, have awarded

the contract to Chaney & Archibald, 280 La Salle street, of that city, for an addition to their plant. The building will be one story, 50 x 180 feet, and two-story, 40 x 50 feet, of mill and concrete construction.

The South Side Steel & Malleable Castings Co., Milwaukee, has completed the erection of an extensive addition to its plant. The buildings consist of a foundry structure 76 x 260 feet and a shipping and storage building 60 x 80 feet. A new melting furnace and annealing oven will be installed in the foundry department.

The Clarksburg Foundry & Casting Co., Clarksburg, W. Va., recently organized with a capital of $10,000, will erect a plant in that city for the manufacture of gray iron and brass castings. The officers of the company are as follows: E. T. Weir, president; W. B. Osborn, vice-president; Virgil L. Highland, secretary and treasurer, and C. G. Jewett, general manager.

A. Gilbert & Sons, brass foundrymen, St. Louis, have acquired a site on Forest Park boulevard, in that city, and are having plans prepared for the construction of a one-story plant with a two-story front, designed for office purposes. The new plant will be modernly equipped for the manufacture of railroad brasses, bronze and aluminum castings, babbit metal, etc.

The Falcon Bronze Co., Youngstown, O., reports that it is building a one-story brick addition 20x47 feet to its foundry, in which it will install two double chamber furnaces furnished by the Rockwell Engineering Co. An oil tank for storage purposes in connection with the furnaces will also be added. The additional space and equipment will increase the capacity of the foundry about one-third.

Work is progressing rapidly on the erection of the new plant of the Standard Welding Co. at the junction of West Seventy-sixth street and the L. S. &. M. S. railroad, Cleveland, for which the Corlett Engineering Co., of that city, is the engineer. The main building is a three-story steel frame with brick walls 50 x 400 feet, and adjoining this is a saw tooth building 75 x 470 feet with steel frames and brick walls. In addition, there is a pickling plant 120 x 130 feet of mill construction. The power plant adjoining the main building will furnish 1,000 horsepower for the operation of the plant.

The contract for the new machine shop to be erected at Stenton avenue and Louden street, Chestnut Hill, Pa., for the Earle Gear & Machine Co., has been awarded by Ballinger & Perrot, Philadelphia, the architects, to the Concrete Engineering & Supply Co., New York. The building will be 70 x 138 feet and two stories. It will have columns, floors and roof construction of reinforced concrete with slag roof covering. The walls will be of brick with concrete lintels over windows and blue stone sills. The building will have a siding from the Reading railway running directly into the building. There will also be a 10 ton electric traveling crane with a 23 foot span running in the center of the building.

The Best Steel Casting Co., Montreal, Can., is proceeding rapidly with the construction of its new plant. The steel casting plant contains a 10 ton open-hearth basic furnace, operated by oil fuel and steam pressure planned by Carr & Speer, engineers, of New York. The plant's daily capacity is 40 tons. The main foundry building is to be 196 x 200 feet, equipped with cranes, floor rails and turn tables. The cleaning room will have Sly cleaning mills supplied by the New England Engineering & Equipment Co. The plant will be operated by a gas engine and producer. The company is capitalized at $300,000, and the following are its directors: Orville Louis Henault, Louis H. Henault, Thomas J. Best, Alphonse Nadeau, of Montreal, and Joseph A. Aquila Leclair, Verdun, Quebec.

General Industrial Notes:—

The Mueller Machine Tool Co., Cincinnati, has increased its capital stock from $40,000 to $50,000.

The Detroit Wire & Iron Works, Detroit, has increased its capital stock form $6,000 to $15,000.

The Waterman Wheel & Foundry Co., Houston, Tex., has decided upon an increase in its capital stock from $75,000 to $100,000 to improve its plant.

The Star Mfg. Co., Carpentersville, Ill., manufacturer of saw shapes and steel specialties, has filed an amendment increasing its capital stock from $200,000 to $300,000.

The Huntsville Foundry & Machine Works, Huntsville, Ala., reports that the damage sustained from its recent fire was almost entirely in patterns, and that no new buildings or new machinery will be required.

The Warsaw Wire Fence Co., Warsaw, O., has been sold by the receiver to Dr. P. M. Moore, of that place. The plant was erected as a branch of the Farmer's Co-operative Harvesting Machine Co., Springfield, O., but it was never operated because of financial difficulty.

The board of directors of the La Belle Iron Works, Steubenville, O., at its recent meeting passed a resolution favoring the increase of the capital stock of the company from $7,500,000 to $10,000,000, and recommended to the new directors, who will be elected in September, a stock dividend of 33 1-3 per cent.

The Allegheny Valley Malleable Iron Co., Pittsburg, has increased its capital from $10,000 to $250,000. Among the other recent capital enlargements by Pennsylvania corporations are the International Boiler Works Co., Stroudsburg, from $100,000 to $200,000; the Foulds Machine Co., Philadelphia, from $125,000 to $750,000, and the Otto Gas Engine Co., Philadelphia, from $253,000 to $903,000.

The Toledo Chimney Machine Co., Toledo, recently organized, is having built under contract a machine for the manufacture of glass chimneys and is leasing it on a royalty basis to chimney plants throughout the country. The machine obviates the necessity of a great deal of hand blowing work. B. C. Gilligan, one of the inventors of the machine, is president and treasurer of the company.

The machine shop and manufacturing plant at Charlotte, N. C., and the machine shop and foundry near that city, operated by the D. A. Tompkins Co., have been merged under the corporate name of the American Machine & Mfg. Co. The new company has consolidated the two plants at Dilworth, a mile and a half from Charlotte, where it has also built a large foundry for the manufacture of soil pipe. The equipment for this addition has been purchased and partly installed, and no further contract in this line will be placed at this time.

The Fowler Co., Oil City, Pa., recently incorporated to manufacture gas and gasoline engines, is having its 10 horsepower engine built under contract by the W. M. Condrin machine shops, of Oil City, while the smaller sizes are being manufactured at the original plant of the Fowler Machine Works at Bradford, Pa. The company expects to lease or buy its own property in Oil City within a short time and install its own plant for the manufacture of its products. The officers are: W. B. James, president; Orah Smith, vice-president and general sales manager; W. N. Moland, treasurer, and C. P. Grundin, secretary.

The plant of the Consolidated Rol-

ling Stock Co., Detroit, has been purchased by well known Detroit capitalists with large experience in railway equipment manufacturing and will be operated by a new corporation known as the Detroit Carbuilding & Equipment Co. The plant occupies seven acres of land located at the intersection of the Wabash, M. C. & L. S. railroads, Dix and Waterman avenues. It consists of car sheds, material sheds, planing mill, engine house, etc., all well equipped with machinery and tools. A large stock of car material is at hand, and the plant is ready for the immediate resumption of the manufacture of freight and logging cars. M. Mitshkun, of the M. Mitshkun Co., Detroit, manufacturer of railway equipment, and Isaac Applebaum are among those interested.

Trade Notes:—

The Canton-Hughes Pump Co., Canton, O., has recently opened an office in Cleveland at 805 Superior avenue N. W.

The National Tube Co. announces the removal of its San Francisco office to rooms 912-917 Crocker building.

The American Sheet & Tin Plate Co. has removed its San Francisco offices to rooms 918, 919 and 920 Crocker building. J. B. Williams is manager of sales.

The Simonds Mfg. Co., through its New York office at 40 Murray street, is distributing a folder describing the "Culley" flexible hack saw blade. A novel feature is the manner in which a small sample saw is securely fastened in the fold of this publication, a portion of which is detachable into a postal card order blank, for use after the sample saw has been given a trial.

The Vredenburg Co., recently established with an office at 1332 Monadnock block, Chicago, is devoted to a consulting practice in engineering and general technical advertising. The company is prepared to render expert service to engineering, contracting and manufacturing companies. The manager of the company, Clarence Vredenburg, was editor and manager of the *Engineering World* from its inception until its recent sale, and is well known in the technical field.

Wickes Brothers, who in January moved their office and salesroom from the Empire building to the Decatur building, 117-119 Fourth avenue, Pittsburg, have found the change to be entirely satisfactory and so advantageous that the Fourth avenue quarters will be made permanent. Several new agencies have been added, among which are Blaisdell air compressors, Eureka concrete mixers, St. Mary's gas engines, Peerless gasoline geared contractors' hoists, Murphy rock drills and Loew Victor pipe machines. No change whatever has been made as regards the Forty-fifth street office and warehouse, where the same large assortment of machinery can be found.

Fires:—

The car building and repair plant of the Chicago, New York & Boston Refrigerator Co., at Elsdon Station, Chicago, was visited by a disastrous fire July 31, which caused damage of more than $100,000. The blaze originated in the steel shop by the bursting of an oil pipe.

FOREIGN TRADE OPPORTUNITIES.

(These inquiries from prospective foreign purchasers are furnished by American consuls to the Government Bureau of Manufactures, Department of Commerce and Labor. Those in which the addresses are omitted are on file at the Bureau of Manufactures, Washington, D. C. In applying for addresses refer to the file number.)

No. 1228. Panama Canal Supplies.—The Isthmian Canal Commission, Washington, D. C., invites proposals until August 2, 1907, for the furnishing of 500 dump cars. (Circular 377.)

No. 1234. Electric power plant equipment.—An American consul in Central America states that a mining company is planning to erect an electric power plant at a waterfall near their mine and will probably be in the market for a complete outfit in connection therewith.

No. 1244. Machinery.—The government of South Australia at Adelaide desires to purchase $30,000 worth of machinery for a dry dock.

No. 1245. Railway cars.—The Italian government railways are in the market for 70 luggage vans (bogie truck) with postal compartment, of the corridor type D. U. I., G. R., and 120 ditto, two-axled, type D., G. R.; also reserve pieces for locomotives.

No. 1251. Stonecutting machinery.—Manufacturers of appliances for quarrying stone are requested to furnish an American consulate in the Orient with full information and catalogs concerning stonecutting machinery.

No. 1253. Metal ceilings and building supplies.—An American consul in a growing German city states that metal-plate ceilings and side wall are almost unknown in that part of the Empire. One dealer has travelers visiting the neighboring towns, who would show plates and designs of American supplies and explain the advantages of metal decoration.

No. 1255. Bridges.—(1) Tenders are invited until September 18, 1907, by the Municipality of Alexandria, Egypt, for the construction of two swing railway bridges for the Mahmudieh Canal. (2) The German government has appropriated approximately $170,000 for the erection of a new bridge over the Fulda River, Cassel. Address for particulars, Buergermeister, Cassel, Germany.

No. 1256. Iron construction material.—Tenders are invited until December 16, 1907, by the Brazilian government for iron construction material for new workshops of the Central Brazilian railways. Address for particulars, Direccao de Estrada de Ferro Central de Brazil, Rio de Janeiro, Brazil.

No. 1258. Railway equipment.—(1) An appropriation of approximately $46,845,000 has been passed by the Russian government for rolling stock for the years 1907-1911 for the government railways. Inquiries for contracts should be addressed to the Minister of Ways and Communications, St. Petersburg, Russia. (2) The Belgian government invites short-term tenders for 300 locomotives, 200 tenders, Westinghouse brakes, wheels, etc. The appropriation for the same is about $6,000,000. Address Minister of Railways, Posts, and Telegraphs, Brussels, Belgium. (3) Short-term tenders are invited by the Chinese government for the construction of a line, in sections, along the Russian frontier of Turkestan, parallel with the Middle China to Taschkent trade route. Address, Board of Communications, Peking, China.

TRADE PUBLICATIONS.

Drop Forging Machinery.—The E. W. Bliss Co., 8 Adams street, New York. Catalog 5 x 7¼ inches, 30 pages; and vest pocketbook, 3 x 6 inches, 40 pages. The catalog presents illustrations and specifications of a line of drop forging machinery ranging from 600-pound drop hammers to 3,000-pound drop hammers and also illustrates trimming presses of various sizes and types for use in finishing drop forgings. The vest pocket memorandum book contains information relating to wire gages, weights and measures, specific gravities and melting points, horsepower of shafting and belting, rules for gearing, circumferences and areas of circles, etc., together with a number of blank pages for memoranda.

Electric Hoists.—The General Electric Co., Schenectady. Bulletin 4518. This bulletin describes the numerous applications of electric hoisting machinery and gives an outline of the work the General Electric Co. is now doing in that field. The hoist motors, controllers, etc., are of standard manufacture and their particular advantages are brought out in the publication. It also presents a partial list of installations and a large number of illustrations of different types of standard electric hoists, together with general information regarding motors, pumps, hoisting power, etc. Other bulletins recently issued by the company are No. 4504, tungsten lamp for street lighting; No. 4506, Edison gem filament 50-watt lamp; No. 4512, manhole fuse boxes; No. 4516, circuit breakers; 4517, isolated plant switchboard panels with fuses.

Grinding Wheels and Machinery.—The Norton Co., Worcester, Mass. 6 x 9 inches. 146 pages. This is a comprehensive catalog presenting illustrations of a vast range of grinding wheels of various shapes and sizes adapted to all services; it also lists a number of grinding machines ranging from the small bench grinder to a 3-inch floor grinder taking two wheels 36 inches diameter by 4 inches thick. The catalog also presents information regarding properties and testing of wheels.

Grinding Machines.—Norton Grinding Co., Worcester, Mass. 9¼ x 6 inches. 63 pages. This catalog describes a large number of machines for fine cylindrical grinding ranging from a 6 x 32-inch machine to an 18 x 168-inch machine. It also presents illustrations of car wheel grinding machines and gives examples of work done on grinders showing superiority both in finish and time over lathe work.